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HINTS

ON

Fruit Growing.

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BY

H. E. V. PICKSTONE.

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1901:

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## INTRODUCTION.

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We trust the following "Hints to Growers" may be found of some little service to some of those who are following and who intend embarking in our Industry and also to the Dilettante who finds amusement in the garden. We have tried to make our remarks practical and the ideas intelligible. Several paragraphs have been taken over from foreign sources, as we found there our own ideas very clearly expressed. Advice tendered herein to growers is not theoretical but is based in nearly every instance on personal experience, or the experience of others that has come under our observation. The whole has been brought thoroughly up to the date of our latest experience, which in some instances readers will see it has been found necessary to alter or modify from those contained in our last catalogue. No attempt has been made to deal with technical questions such as the character of soils, the action of manures, the budding and grafts of trees, the circulation of sap, &c.; all these matters can be found in the numerous standard works on fruit culture written by much abler pens than ours, and by men who have technical knowledge which we make no claim to possess.

## VALUABLE TABLES.

### DISTANCES FOR PLANTING.

Apples	...	...	...	20 to 30 feet apart each way.
Pears, standard	...	...	...	15 to 20 feet apart each way.
Pears, dwarf	...	...	...	10 to 15 feet apart each way.
Peach	...	...	...	15 to 20 feet apart each way.
Plums	...	...	...	15 to 20 feet apart each way.
Quinces	...	...	...	12 to 16 feet apart each way.

### NUMBER OF TREES ON AN ACRE AT VARIOUS DISTANCES.

10 ft. x 10 ft.	...	...	...	435
11 ft. x 11 ft.	...	...	...	360
12 ft. x 12 ft.	...	...	...	302
13 ft. x 13 ft.	...	...	...	257
14 ft. x 14 ft.	...	...	...	222
15 ft. x 15 ft.	...	...	...	193
16 ft. x 16 ft.	...	...	...	175
17 ft. x 17 ft.	...	...	...	150
18 ft. x 18 ft.	...	...	...	134
19 ft. x 19 ft.	...	...	...	120
20 ft. x 20 ft.	...	...	...	108
25 ft. x 25 ft.	...	...	...	69
30 ft. x 30 ft.	...	...	...	48

To ascertain the number of trees or plants required for an acre :  
 Multiply together the distance that the trees are to be set apart  
 each way and divide this into 43,560 (the number of square feet  
 in an acre), which will give the number required.



## THE HORTICULTURAL PAST.

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Our experience is that there are two classes of farmers in this country, who are paying attention to fruit growing.

First the old-fashioned type who swears by and insists on continuing to plant the well-known varieties, such as Summer or Winter Saffron in pears, Wemmer Hoek, Hugo or May in apples, and peaches which come under the generic style of Los pit and Taai pit; in apricots, Cape early and late.

Then again the new man, who must have everything in new and latest varieties either English or American, and who can see no merit in anything standing in our old orchards. Now, after nine years careful study of our old Cape orchards, and of pushing into public notice new varieties from England, America and Australia, we consider we are able to give an opinion of some value as to the respective merits of the different ideas of these several classes of growers and planters.

Nine years ago we found very few young orchards being planted, either East or West. In the West such planting was almost entirely confined to the planting of the old varieties mentioned. In the East again at this period planting was generally confined to new varieties which had been introduced during late years by the several nursery firms engaged in distributing fruit trees.

In the West we would say that the planting was being undertaken by those who had proved that small profits could be made out of their orchards then standing, by consigning to local markets, by drying in the sun by the slipshod methods then in vogue, and by selling to the jam factories.

In the East we think that the planting was mainly due (outside of many commercial citrus orchards) to the wish of the individual farmer to have enough fruit to supply his household needs and therefore the lists of varieties ripening at different times vide the nurserymen's catalogue appealed to the idea of planters, to have a continual small supply of fruits of different dates of ripening, colour, and characteristics. We would now wish to point out to our readers that although at this date the planting being undertaken was commercially of practically no value to the country, we consider at the same time very good work indeed had formerly been done both East and West, but particularly in the West, towards assisting. One reason is this: we feel satisfied that very many years ago probably, in the last century, and in some instances early in the present one, when France was far in the van of Horticultural progress and knowledge, in fact to an extent that we think is scarcely recognized to-day, and when the influence of France probably passed

into Belgium and over the eastern frontier, settlers at the Cape were up-to-date and well to the front in the varieties that were being introduced. Whether this was due to the enterprise of the old Dutch East Indian Company, or whether to individual effort we are uncertain, but we incline to favour the former theory, as we know that the Dutch East Indian Company, were fully alive to the necessity of the Agricultural development of their Colonies; in fact, we have no hesitation in saying that probably they did infinitely more for the Colony than our Agricultural Department since its establishment in this respect. We practically have this position, during the last Century and also in the earlier half of of the present one the best varieties of fruits were being introduced as, they created for themselves a reputation in Europe, these varieties were disseminated through the country, being as a matter of fact widely scattered, we would take it in the usual way that prevailed in those days, when a farmer trekked further into the country he would accept from his neighbours a few trees of the varieties they favoured to stock his orchard, in his new home. It is indeed a most interesting study to work out and follow up the Horticultural History of the Dutch and other settlers.

We are satisfied, as we said before, that under the Dutch régime the best and most popular European varieties were introduced as they forced themselves into public notice. Thus we can to-day trace they were planted out in the Peninsular, also in Hottentots Holland. They include, amongst others, well-known old sorts in Pears. Bon Chretien, Easter Beurré, Glout Morceau, Beurré Diel, Beurré Clairgeau, Winter Nelis, Bergamotte Crassane, Louis Bonne de Jersey, White Doyenné, Duchesse D'Angoulême, Doyenné D'Ete, St. Germain, Van Mons Leon ie Clerk.

No doubt many other varieties were introduced at the same time, but in the operation of natural selection, the survival of the fittest has been going on for such a long period of years that undoubtedly very many have been discarded long ago.

Let us follow up the history of the introduction of these varieties. As we said before, they were all planted in the vicinity of Cape Town, giving at the time a wide selection of fruit covering, many months of ripening and having every quality possible, and having been amply tested at home before their introduction. We would however take it that although our theory is the Government introduced them this Government did not through experts or by any means take care to demonstrate and teach the grower the way of bringing out the points of their varieties, or if so, the art has been entirely lost, this information and knowledge being absolutely necessary to ensure their maintaining the reputation which, as we said, led to their introduction. Hence, although all these varieties named grew and thrived well, and were originally distributed in the surrounding, districts to wit Stellenbosch, Somerset West, Paarl, and indeed in all the old villages and in many of the old farms established early in the century, they gradually dropped out of favour, and the farmers fell back on the few varieties

which grew readily and most strongly, and which were easily propagated by suckers, in fact Horticulture as an art never took root here. We can readily follow up our idea by taking the characteristics of some of the different varieties named.

The *Doyenne D'Eté* has been retained generally throughout the country because it is very early, in fact the earliest ripener still in the country, and if picked green is pleasant and good to eat.

The *Bon Chretien* had been discarded because it needed picking green and hard, and if not picked in this state was found when still on the tree rotten at the core. The *Winter Nelis* had been discarded because it was small, unattractive in appearance and was bullet hard. The *Easter Beurree* likewise was bullet hard, and used for pigs' food; these two latter were rejected, the former being too small and the latter not exactly too hard, but at all events not equal to *Winter Saffron*, it neither bore so well, grew so strongly, nor tasted so well.

Some of our readers may think we are too hard on the descendants of the introducers of these valuable varieties, we however claim that we are not so.

Some will say, oh yes, but where were the markets for these good varieties; farmers could not sell them that is the reason why they were gradually rejected by those who trekked North, South-east and West. This is a plausible excuse but will not bear analysis. Because at the time of our landing here Peninsular growers with a few exceptions were entirely ignorant of the names, value, and manner of picking to get the necessary results, in fact scores of times we have had the fine varieties mentioned above abused by those on whose places old trees were standing for one or other reason, which only showed they were quite ignorant of the way to treat the fruit to secure good results. To sum up, we will put it again, Horticulture as a science never took root in this country, because no steps were taken to disseminate knowledge, the introduction of good fruits being considered all that was required. We however know that even to this day it is thoroughly recognized that it is perfectly useless to put into hands of growers even the very best fruit trees without proper instruction as to the characteristics and care of varieties, and later on the marketing of the fruit.

We append here the origin of several of the old varieties that we claim have been very many years out here.

*Bon Chretien* raised in 1770, propagated by Williams' a nurseryman, of Turnham Green, Middlesex. Introduced to U.S. 1799, by Enoch Bartlett, of Dorchester near Roston; is named after him and was also early introduced to France.

*White Doyenné*, raised in France over 200 years ago.

*Easter Beurree*, originated in Garden of the Monastery of the Capucins at Louvain, distributed by Van Mons, beginning of present century.

*Van Mons Leon Leclerk*, raised by M. Leon Leclerk of Zaval, fruited 1828.

*Winter Nelis*, raised early in the present century by M. Jean Nélis of Malines in Belgium.

*Duchesse D'Angoulême*, raised early in the present century by M. Aime-Pierre Andusson, of Angers, and named with permission.

*Glout Morceau*, raised very early in the present century by Councillor Hardenpont at Mons.

*St. Germain*, a very old French variety, originated end of 17th century, near the place in France after which it takes its name.

*Louise Bon de Jersey*, raised by M. Longueval at Avranches in 1788.

*Bergamotte Crassane*, very old variety, raised in 1667 in France, origin uncertain.

*Beurré Diel* an old Belgian seedling discovered by Van Mons in the beginning of the century near Brussels.

*Doyenne D'Ete* origin obscure but well-known and popular at the beginning of the present century.

In regard to Peaches and Apricots, we consider that the varieties widely grown and popular throughout the country, to be of equally early arrival in this colony:

The *Cape Freestone*, so well known as the "Cape Peach," we take to be a descendant of the *Grosse Mignonne*, a very old and celebrated French variety, which has maintained its reputation for close on 200 years. This variety practically comes true from seed, and we consider that its variableness is owing to its having been propagated since its introduction both by seed and by grafting.

The *White Pavie* (clingstone) is also an old French last century variety, and is one of the *Pavie* (or clingstone) class of Peaches. We think the identity of the "Cape Clingstone" to be found in the well-known and celebrated old French Clingstone *Poire de Pomponne*, which we can only take has been propagated in several places at different times from seed as well by grafting, as we have seen so many variations in size and quality, although each shows a similiarity which tends to show they are nearly akin.

In *Apricots* we feel we are unable to determine anything in regard to their origin and as to what varieties they spring from. We gather that their identity has been lost owing to the haphazard way in which they have been propagated since their introduction.

In *Plums* it is interesting to remark that practically every variety, and there must have been many varieties that were introduced in the early days of settlement, have failed to give satisfaction to the planter, the result being that at the date of which we write, if one examines the old plum trees scattered about the country, one must come to the conclusion that the growing of the better varieties had been long abandoned by the farmers, and that the few that were standing and bearing fruit were of the varieties which were the stock carriers for the earliest importations, to wit, the Xmas plum, a small round red one, which is nearly akin to the myrobolan, and which we think to be identical with the

myrobolan so celebrated as a non-suckering stock carrier in Europe, Australia, and America. Then again the Early Golden Drop, widely disseminated throughout the country, is a kindred sort, and more or less identical, except in the colour of its fruit.\*

The only other sort which one sees practically all over the country is the small blue plum, which can be identified by the number of suckers that it throws up; this is undoubtedly the Black Damas, used largely as a stock on which to grow plums, and the fruit of which is miserably sour and unpalatable.

We may add we have seen these three varieties named scattered over the Colony, East and West, and through the Transvaal and Orange River Colony. So here we claim we have the interesting fact of the grafted sorts dropping clean out of existence, and the stocks remaining and being disseminated as worthy of planting, and in the matter of plums the problem has not yet been solved in the country as to how to get a uniform good result from Plums of the domestic type except as regards a few varieties.

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## REVIVAL OF INTEREST IN HORTICULTURE.

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Some ten years ago our Industry, as an industry, was in a parlous state, the planting being undertaken being on a scale which prevented its ever cutting a figure in even inter-Colonial trade and the Export as a possible Colonial Industry had not been considered. Agriculture was at a low ebb, and the then Government were fully alive to this fact. It was before we arrived in Africa, but we know that the then Rhodes Ministry, realizing the hopeless character of the Agricultural Industries, were looking to fruit as a possible means of bettering the condition of the farmers. We know from our own personal knowledge that Mr. Rhodes himself, also Messrs. Sauer and Merriman, were keenly interested in the possibilities. Early in 1892, Mr. Merriman being in London at the time, he spent much time in Covent Garden personally satisfying himself as regards the possibility of building up a trade. It was during the following session of Parliament that Major Tamplin asked for a Select Committee to enquire into the prospects of pushing a successful industry, this being the natural outcome of the excellent returns received for the small lots of fruit sold in London that autumn. In connection with the sale of this fruit the following special Telegram to the "San Francisco Examiner" may be worth quoting as showing the general interest taken in the matter of South African fruits on the London Market.

*Special to the "Examiner," London.*—February 9th, 1892.—A second cargo of fruit from South Africa arrived to-day, and it is stated that everything it comprises is in excellent condition. The first

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\* History of myrobolan traced back to 1601.

cargo, which arrived last Thursday, brought fancy prices, peaches selling as high as £4 for 3 dozen. It is believed that equally good figures will be received for the present consignment. The cargo includes not only Peaches but Tomatoes, Grapes, Pine apples, and Cucumbers, all of which are luxuries in London at this time of the year. The trade seems to have been successfully inaugurated between the Cape Colony and the Mother Country, and it is believed that an immense and profitable field of enterprise has been opened to all the Southern fruit-producing countries; it is certain that London can absorb any quantity of fruit at this season, and there seems no likelihood of the new business being overdone.

Major Tamplin's motion was well received by the House, showing its feeling towards any possibility of Agricultural development. We would say that the net immediate result of the Select Committee and the interest shown by the Government then in power was the fact that it brought fruit-growing into the focus of the public eye, which was what was needed at the time, but there are undoubtedly very much greater results than this, which ever since that date have been quietly accumulating as follows.

It has been we consider largely owing to the interest taken in the Fruit Industry that farms in the Western Province to-day have increased so enormously in value; the value has doubled, and in many instances trebled, within our own knowledge. Many of our farmers in the West resent the presence of the new comer, whose leaning in most instances was fruit rather than wine. We claim, however, that it is owing to the advent of these self-same uitlanders that many of our farmers have been enabled to tide over what has been for all a very severe struggle. Food stuffs and forage going up in price; wine going down (we remember it at £2 10s. per leaguer.) Phylloxera ravaging most districts placed our farmers in a most unenviable position. Five years ago mortgages were foreclosing right and left, and the confidence of capitalists and merchants in the future of the Western Farming industry had sunk to zero.

The interest taken in the newer fruits and the enterprise often of the farmers themselves and the confidence engendered by the then satisfactory behaviour of the newer fruits, we consider turned the scale as regards confidence in Western land. Wine farmers will claim it was the wine industry; we claim however no, as wine was during this period at a very low figure indeed and the farmers were at that time undecided with what stocks they could successfully cope with phylloxera. As we say, from about four years ago, prices of land in the Western Province has been steadily going up—the result to the occupier being that his friend the mortgagee, who was at that time getting restless and uneasy, began to be inclined even to help him with increased loans, and with the assistance of these loans, which we claim was justified by solid natural increase in value of the soil, farmers were able to go on with tree and vine planting, with the net result that to-day the land in the Western Province has increased in value to the extent of several million sterling.

Due to increased confidence in agriculture and the opening up of the North and the establishment of communications thereto. In the Eastern Province, the result of the planting of fruit trees has not, we consider, cut anything like the same figure in the development of agriculture. The planting, however, has steadily gone forward, and we know for a fact that merchants and others interested in the development of the country at the back of them have considerable confidence in the possibility of fruit cutting quite a figure in the development of the country, in fact we know of mortgagees who in lending money on land have insisted, before doing so, that a certain number of fruit trees shall be planted and *cared for* as giving additional security for their money, and this is as wholesome a sign as can well be.

Altogether we claim that eight years ago there began a revival of interest in fruit-growing—we say advisedly revival—because as we have stated in the chapter under the head of “The Horticultural Past,” we consider there was formerly a deep and widely distributed interest in fruit. The difference between the interest taken then and that taken now being, whereas it was the natural interest of an horticultural loving people who had a leaning towards improving their fruit, to-day it is the commercial minded man who thinks he sees a chance of making money.

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## BOTANIC GARDENS.

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We think a few lines in acknowledgment of the good work done by the Botanical Gardens in the Colony will not be out of place. Let us recognize at once that they have done most excellent work.

Throughout the British Colonies and Dependencies the establishment of Botanical Gardens has invariably followed, British rule. Without having any certain information as to the origin of the idea we shall put it down to Kew, the Director of which unique Institution has done an enormous lot of work in assisting the Colonial and India Office in the development of the cultivation of products of the soil. Perhaps in no other part of Her Majesty's Dominions has this been more clearly demonstrated than in the West Indies, where owing to the terrible depreciation in value of land and diminution of wealth, consequent upon the taking off of the sugar duties, the financial ruin of our Colonies there appeared imminent. The result of the Commission appointed by the Colonial Office in 1896 to enquire into the state of the West Indies being that it was decided that new products must be found to take the place of the sugar cane, and it is mainly we believe through the agency of these institutions, which are scattered through every island of the West Indies, that the plants and data as to cultivation are to be

disseminated. We may have wandered somewhat from our point as to our own Botanical Gardens, but we must admit that besides the valuable work of investigation which is outside the province of the ordinary farmer and settler they have been the main means of the dissemination, throughout the Eastern Province especially, of nearly all the newer varieties of deciduous and citrus fruits and also of seeds. Their great utility being of course that they went into this matter at a time when the public would not support private enterprise or when private enterprise concluded that such was the position. The fact remains that Horticulture would not have been in the position it is in to-day in this country, without the assistance of the Botanical Gardens during its early struggles. Of course to-day private enterprise has stepped in and has naturally absorbed the lion's share of the business, but we have much pleasure in placing on record the fact that good work has been done by these institutions at a time when nobody else cared to do it.

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## PROSPECTS OF BUILDING UP AN AFRICAN FRUIT TRADE.

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Our belief in the possibilities of the Cape for an export trade in fruit to Europe and America is well known to those interested in fruit culture and Colonial development. *This belief is absolutely fixed*; nothing can shake it. It will take time to justify it, but if it turns out otherwise than as we state,—with the growers rests the blame; of that there can be no doubt, at all events in our mind.

With a full knowledge of our unique position (a command of the markets of the northern hemisphere during February, March and April), we came to Africa now nine years ago. And the result of our observation during that period has amply proved to us, that we have the other necessary elements of success, *i.e.*, that we can grow good fruit of excellent quality, size, and flavour. We therefore find an open and empty market in deciduous fruits of a three months' duration in both Europe and America awaiting us; and we on our side know that, on much of our soil, good fruit can be grown. The Government and private individuals in places have stepped in, and have amply testified by thorough and practical experiment that certain of our fruits, and those almost entirely are the sorts desired in the several markets open to us, can be successfully shipped to England. And there remain only two points (and on the successful and satisfactory solution of these two points the ultimate success of the industry depends) to be settled: firstly, a fair and reasonable basis of freight charges with the Steamship Companies; and, secondly, a thorough system of distribution on the other side of the water,

whether in Europe or America. We have absolutely no doubt that the former point, when the right time comes, will be amicably and satisfactorily settled with the several Steamship Companies, that time being when we can guarantee weekly consignments of many thousand cases. In regard to the second; it is purely a business proposition, and how it is to be arranged need not worry us just yet.

During a late visit to Europe we enquired from many sources in the trade in England as to how they viewed the prospects of getting fruit from South Africa; and in each and every instance the reply was the same. An empty market and good stuff would be sure to bring good prices, and that the trade would welcome such stuff as filling a much felt want. We also had the advantage of having several conversations with Mr. W. Fox Pickstone, Vice-President of the A Block Fruit Company, who manage some of the largest fruit export houses in California, and whose brand stands easily first in Covent Garden Market, in the Anglo-Californian Fruit Trade. He agreed that the States offered a wide and open market for our fruits in February, March and April, and provided the stuff was received in good condition the prices realized *must* prove very satisfactory.

As regards Australian Competition, we need not fear it. They are unable to reach Covent Garden until three weeks to a month later than we can, and the increased distance and consequently longer period of time in transit round prevent their competing on equal terms, as regards price of freight and condition on arrival, the two most important points, as mentioned above. It may be, in fact probably will be, many years before we shall offer any spirited resistance against Australia in apples, as the plantations of this fruit necessary to attain this object have not yet been set out, but when we have made up our minds finally as to which districts in the Colony we can grow the best quality of apples, and use that knowledge with the proper spirit of enterprise, there is no reason why we should not compete successfully here also.

All those interested in the welfare of the Colony and its fruit possibilities in particular will have been pleased to note that the right spirit of enterprise has taken up the planting of commercial orchards on sound practical business lines in many parts of the Colony. Amongst others the Right Hon. Cecil Rhodes, who is generally credited by both his friends and enemies with seeing about as far into a brick wall as most people, has considered that money invested in this direction will be for the ultimate benefit of the Colony and himself.

We have always considered that pears must be the basis on which we must build up our Export Trade in fresh fruits, and this opinion we find is shared in both England and America.

Peaches, apricots, nectarines, plums, and apples (the latter for a long time to come) will always be accessory to pears.

We do not for a moment wish to let intending planters labour under any delusion as regards the Export trade in fresh fruits, and here state plainly our opinion. Unless a grower is conveniently situated near the Railway and within reasonable distance of a Colonial Port, he has no chance of competing on fair and even terms, and had best make up his mind to look to another direction for his outlet, *i.e.*, to Colonial consumption. It will be difficult to keep pace with it in apples particularly for many years, therefore late keeping apples will undoubtedly pay. In districts where peaches do well, and some of these districts are many miles from a railway drying varieties of the *Yellow-fleshed* peaches only should be planted—melting white-fleshed peaches would prove unprofitable—in such a locality. Apricots of all the varieties listed in Colonial Nurserymen's catalogues will make a decent dried product. In plums the drying varieties, *i.e.*, prunes of the several sorts, should be planted in districts miles away from direct railway communication, and in pears varieties that dry well, as Bon Chretien, Beurre Hardy, Louis Bonne, &c., &c., and if a district so situated is particularly suited to pears, late varieties such as Winter Nelis, Easter Beurre, Glout Morceau, &c., should bring satisfactory returns, as they are very firm, bear transport well, and are long keepers.

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## DRIED FRUIT.

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At present we cannot supply ourselves, and even for some years to come, at the present rate of planting of the varieties for this purpose, our best market will be here.

The demand for fruit dried at Wellington has been excellent, and prices realised most satisfactory to all concerned. This is mainly in apricots. We have only seen small sample lots of dried peaches that would be stocked by first-class dealers. We cannot too strongly impress on planters the importance of planting drying varieties of Peaches if it is at all probable that the crop may have to be dried. It means securing almost double the crop on the same acreage, and makes a nice showy product, with red centre, in place of the ordinary filthy black-brown production, which finds a market, we don't know where, at 2½d. per lb.

Vieing with the Apricot in importance as a drying fruit, comes the California Prune (Petit D'Agen). The increase in popularity of this, from a grower's point of view, has been phenomenal in California, the output of the State in 1885 being 1,500,000 lbs. dry, increasing in 1893 to 57,500,000 lbs. dry. The consuming public also fully appreciate its merits on the table, as in 1887, we find the import of this fruit alone to the United States reached the enormous figure of 92,000,000 lbs. For further particulars of this variety, see page.

As for the export of Cape Dried Fruit, we must always remember that we come into direct competition with the whole of the world in the English market. The other markets of Europe and America, as they are either protected by a heavy duty or are heavily supplied with home product. In regard to the English market for dried fruit—it is increasing in value annually as the prices come down and the consumption is extended—we have here, conjointly with Australia, the advantage of putting our crop of fresh into the market on the top of the tail end of the European one of the year before, which is to a certain extent an advantage, but there is no doubt that the demand will always in England be ruled by the price, no matter from whatsoever country the fruit may come, and we should put this roughly at 6d. per lb. in apricots, prunes and pears, in good grades. Personally, we think we can do good business and make money at this figure, as we can utilize land which is now lying idle and bringing in absolutely nothing for raising drying fruit, whereas if we take one of our competitors in dried fruit on the English market, California to wit, which has already successfully catered this market, we know that growers there must pay £20 per acre and upwards for the land which grows such product. Therefore if growers only rise to the value of their opportunities we claim that they will make a very fair name for themselves, and bring a good deal

of money into the country by tackling this branch of the fruit trade in the right spirit. We may add that there is very little demand for dried peaches in England.

Our opening statement will, we feel satisfied, be borne out by our later experience in this branch of the trade. Our best market will be a home one for years to come. There is no more portable commodity, and none more palatable, than dried fruit of good quality, and the fault is ours if it does not take an important place in the mining camps, and prospecting kits, throughout the Northern Territories.

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## CANNING.

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In our 1899 Catalogue we say, "There is still no life in the canning branch of our Industry. We think however that no enterprise has yet been justified in this direction, as only fruit of the very best quality is suitable for canning, and at present the value of such fruit is so high in the Colony that canning is really out of the question.

We have little doubt, however, that when fruit of the necessary quality is offering in fair quantities, canning plants will be put in operation to use the same. Planters should know that in peaches, which are probably the most important branch of this trade in America, special varieties must be planted. Many of the varieties of apricots, plums and pears being planted at present are suitable in every respect for canning."

We have much pleasure in stating that the necessary enterprise on the part of the canners has now been realized; all the principal jam makers in the Colony having either already thoroughly equipped canning plants, or they are preparing to put them in without delay. This is as it should be, and we feel certain that they will be repaid. There is not the demand there ought to be for canned fruit in the country at present, although many thousands of cases are imported annually, but we have no doubt whatever that with a Colonial product put on the market nicely turned out and of good quality, the demand will at once increase. We may say that we have sold all our yellow fleshed peaches, also Japanese plums of a good grade that we do not care to export, to the canneries; this season we getting a satisfactory price.

Planters must bear in mind that now the canners have done their share in putting in plants to deal with the product, they should respond by planting canning varieties, particularly in peaches, where as we have said before special varieties must be planted. We cannot too highly recommend for this purpose the Lemon cling, Muir, Newhall and Elberta. of all the American varieties under our observation, we find these sorts the most regular croppers, and that not in one district but spread over a wide area.

It will we expect be many years before the Colony will take its canned fruit to England, but in these days, when the mother country has been drawing gradually closer to her colonies, we would be surprised to find in the not very distant future a preferential tariff in favour of colonial products, especially towards products of the soil—should this occur, and we think it may, the Fruit Industry will benefit to an extent that can scarcely be

conceived. The amount of canned and dried fruit that is exported from the United States alone to England amounts annually to a sum which would allow to flourish any one of our fair-sized colonies.

*Jam.*—The demand for fruit for preserving purposes is excellent and improving. Makers we find are glad to get the new varieties of fruits which are now coming into bearing, at satisfactory prices to the growers.

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## STOCKS.

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As knowledge is acquired and interest in fruit growing is aroused and orchards planted, the question of stocks will as in other countries force itself to the front as one of the most important questions confronting the planters.

For several years after our establishment here it was a question (except with the very few) which never appeared to be considered at all, so long as the tree was a Peach, Pear, Plum or Apple, it would fill every requirement of the purchaser; however, we have lately found considerable interest being taken in this important question, mainly due we consider to the teachings of the Government Experts, who have invariably forced this important question to the front and also through the more intelligent planter having made enquiry into the reasons why some of his trees are not growing satisfactorily.

As a Nurseryman we have also tried to impress on Planters the importance of this (vide catalogues published in 1893, '94, '95), however until lately practically without result.

Planters must realize that in ordering their trees they should expressly stipulate for the trees to be on the stock which is best suited to their soil; *so much depends on this*. At the same time they must bear in mind that there may be technical considerations which go against what otherwise should be a sound choice of stock. We refer to the fact that some fruits don't thrive on roots that they apparently should thrive on.

As we are now frequently asked our opinion *re* stocks we think it will assist planters to enter into the matter at some length, bringing forward the result of a careful study for some years and showing how from time to time we have narrowed up our list of stocks.

*Apples*. There are practically three classes of stocks known to trade:

- (1) *Malus communis* (common apple), which should be the seedlings grown from selected apples as pressed out at the cider mill or at the drying sheds.
- (2) *Paradise* (*malus paradisica*), which is the usual dwarfing stock used by planters.
- (3) Blight proof stocks which are generally of the Northern Spy or Winter Majetin variety and are resistant against the woolly aphid or American Blight.

The common apple is the stock generally used; it is healthy and free growing, without any dwarfing tendency, and makes in every way a sound healthy tree; its most dangerous enemy being the woolly aphid. All varieties do so far as we know, equally well on this stock.

In regard to Paradise stocks there was at one time a considerable call for them in the trade here ; we ourselves amongst others kept a large stock, but have now entirely discarded them, as we found it impossible to keep them free from Blight, and it being moreover a well-known fact that this insect is particularly partial to the paradise root. This stock has the effect of bringing the tree quickly into bearing and tending to increase the size of the fruit ; it is largely used in England, where trees take so long to come into bearing. But here we could not plant them under any consideration whatsoever because their mass of fibrous roots gets matted with Blight, and the growth does not appear free enough to prevent the tree being sun burned in our climate, and it is within our experience very frequently so throughout the entire length of the country.

With regard to the Blight proof stocks we have naturally taken considerable interest in the matter for some years, and find both the Northern Spy and Winter Majetin to be good stocks ; we prefer the former for all purposes, and all our trees worked on Blight proof stock are of one or the other of these two sorts. There are we believe other stocks being used in this country and called Blight proof ; they may be so, but the Spy has to its credit the fact that it has made the apple business of Australasia ; and here we have now had it under observation for 8 years, and have put it to most severe tests without in a single instance finding a trace of Blight on it. Others may have had a different experience, but this is ours. However, growers must understand the limitation of the Spy as a resistant stock. We believe that many think that if an apple, no matter of what sort, is worked on a Blight proof stock, that it will always be free from Blight ; *this is not so*, almost all varieties of apples are subject more or less to Blight, and even if worked on these stocks will be in the same proportion subject to Blight that they were once common, *but the stock will be always perfectly clean below the point where graft is inserted*, and this is a consideration the importance of which cannot be over estimated. Blight above ground can be eradicated, and if not entirely so at least kept thoroughly in hand, whereas once in the root always in the root is a safe prediction.

We have heard people in this country try and belittle the value of Blight-proof stocks by explaining to planters that their trees will get Blight just the same, but I trust that no one will allow themselves to be deceived in this matter.

We consider that in planting out an orchard in a new clean district ordinary common stock to be in every way satisfactory *provided it is sold clean and is found to be so* on receipt by planter who should examine the tree carefully, as the Blight will always go into the head of the tree first and should be detected before reaching the roots ; in fact, we know thousands of apple trees planted in different places within the last 6 years that are still quite clean, *but it needs care* and a vigilant eye to detect aphids on its arrival in the orchard generally.

*Pears* are worked on one of two stocks, either common pear for standards, or quince for dwarfs. The result of our experience has also here been that we have discarded dwarfs, that is to say pears grown on quince, our reason being that the advocates of the quince stock for pear claim that whereas a pear on pear stock will take six or seven years to come into bearing, a pear on quince will only take three or four; our experience of this stock does not bear out this result; we will mention an instance and could mention several of this. Sir James Sivewright has at Lourensford, an orchard of probably 1,000 pears of different varieties on quince; these have stood five years and have not yet borne, and are not carrying any fruit this season, whereas we could show orchards of the same age on pear that are bearing a paying crop of fruit.

We strongly advise planters to leave the pear on quince well alone, unless they have seen much better results than we have. If you are a commercial planter don't be led to plant on this stock without having your mind set at rest by facts in your immediate neighbourhood on similar soil.

*Peaches*.—We can with confidence say that so far as South Africa is concerned, peach stock for peaches is the only stock worth planting; we say this not dogmatically, but after wide experiments with other stocks.

It is of course well known to those who study fruit tree planting that peaches will not thrive on wet, badly drained spots; our soils, speaking generally, here are patchy and in an orchard of a few acres spots low lying and wet are often found; we recognizing this have made thorough experiments in the use of the myrobolan and St. Julian Stock for peaches, these latter stocks being more suited to such soils, but we have met with *no success whatever*, and we have spent considerable time and money with the object of trying to overcome the matter, and as we say have failed. So far as it can be determined the main reason is that in this country peaches will *not* thrive on plum stock, they will always prove unsatisfactory from every point of view.

In America the Almond stock is used to a fair extent on very dry soils for carrying the peach; we have also tried this and find the result unsatisfactory. Therefore we would say to intending planters if you have not got a site for your orchard which can be thoroughly drained or which is not naturally of that character, don't plant peaches.

*Apricots*.—Our experience here is that again the peach root is the reliable root. Years ago we discarded the apricot root, as the growth we found under different conditions was so unsatisfactory. However, in heavy soil the myrobolan root is safe to use, all the varieties of apricots we have tried doing thoroughly well on this root in heavy moist soil.

*Plums*.—The relative value of the peach and the myrobolan as a stock for both domestic and Japanese plums and also prunes has been a much debated question now for the last two years. We will simply repeat our experience with deductions.

Of the domestic plums very few do well worked direct on to peach root. Most of the well-known varieties make so imperfect a junction that we have had to stop attempting any result. Almost all of them do well on myrobolan as far as making a junction is concerned, but except on soil which is adapted for the myrobolan, that is to say, a stiff heavy soil the growth, of the tree is not satisfactory ; in most instances therefore in dealing with the domestic plums on myrobolan we have a perfect junction (which we do not get in the case of the peach root), but a not altogether satisfactory later result (except on the stiff soil, where it is most excellent and satisfactory). We have now made up our minds to carry out a system of double working the domestic plums ; we have been experimenting on these lines for two years and hope soon to be able to overcome the entire difficulty, and put a domestic plum into the hands of planters which will really give satisfaction ; we may say that other countries have had the same difficulties and are overcoming them in this way. We, however, cannot, we find, literally adopt the result of experiments in other countries, as there is in many instances a very different behaviour here.

Prunes do well on either stock ; it depends entirely on your soil, what root you should have them worked on. The peach is the best all-round stock, but on some soils plum stock is much more satisfactory and even necessary. It would not be out of place here to mention one circumstance which came under our own eye in California, and show the characteristics of the respective stocks better than pages of argument. We knew a nurseryman that budded in 1891 120,000 French prunes, 105,000 were on strong healthy peach stocks, 15,000 were on myrobolan. The soil was alluvial, fairly heavy, the winter when these stocks were carrying dormant buds was a severe one, resulting in floods for several days : for two or three of which the nurseries were under water from the overflow of the river—the effect was that in the middle of the growing season (that is 15th June) in California, the date we visited the nurseries out of 105,000 prunes on peach 1,500 scattered trees only were alive and growing freely, and out of 15,000 on myrobolan all stood 4 ft. high and not a bud lost. As Japanese plums do equally well on either root on any peach soil take them if possible on peach root and *vice versa*.

The Almond root, which we have also tested, we do not care about for any sort of plum or prune ; it does not as a stock in this country fulfil our expectation, based on the place it held in the estimation of growers in certain soils in California.

## REMEDY AFTER GETTING WRONG SORTS PLANTED OR VARIETIES PLANTED ON WRONG ROOTS.

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We have elsewhere (under the heading "What to Do with Old Orchards"), explained the great importance of getting new varieties into bearing age in the shortest possible time to test the value of the variety in the district. Let us suppose that a certain planter has set 1,000 trees in say ten different varieties in apple, pears and peaches, and finds out when they have been three or four years growing that several hundred trees are of varieties, quite unsuited to the district in which he intends growing; there is no occasion to be despondent and feel sorry that he ever started fruit growing; these mistakes are the rule rather than the exception, and do not cause serious loss if tackled in the right manner and in the proper spirit. We have ourselves already on our own property re-worked over 1,500 of such trees, out of a total of about 10,000. We know that some people faced with this problem think there is only one way of rectifying things, by digging out all the trees of the varieties doing badly, this is a very great mistake and entirely unnecessary, *provided* that the trees are growing healthily and that the stems are sound; if these conditions are there the variety must be changed over to one of the other sorts that have been proved to do well, and there are two ways of doing this, either by budding the tree over in the summer or fall, the best time being when well-ripened buds of the required variety are procurable and by grafting in spring.

Personally we prefer the former methods and find it very successful in this country for trees with limbs not above two inches in diameter. The buds must be inserted at the several places on the different limbs of the tree that the grafter thinks will make the best shaped head; it is a matter of judgment, only it is advisable to insert more buds than are required; in fact, with an unskilled worker, we would suggest inserting twice as many buds as will be required. We always consider the main point in working over a tree is to keep the centre well open at time of working, keep the buds or grafts well away from the centre of the head. As a rule in budding over orchard trees the strings around the buds are cut too soon, there is very little danger of leaving them too long, as we will generally find the time of budding has to be carefully arranged as soon as possible after the buds of the required variety are ripe to enable the budder to find enough sap in the trees to be re-worked to make a perfect union.

The other manner of working over is by grafting, using the same judgment in the matter of which limbs are retained for the purpose. There are several ways of grafting: should the branches be thin enough, that is under  $\frac{1}{2}$  inch, we infinitely prefer the whip

graft, if thicker the ordinary cleft graft is generally used and gives good results. It will be found that should the buds or grafts, as the case may be, take well ; that they will throw out a heavy growth of wood ; this growth must be kept well headed back from the time it is, say, 9 inches long, as should it not be carefully watched the first heavy wind will remove entire branches of the new head. At the end of the growing season there should be a well-formed and strong head to the tree, and after another season's growth such trees should have caught up to the remainder of the orchard. If the job is well done in trees up to five years of age no time is lost except in the matter of peaches, where a year is lost. Please well understand what we mean by no time being lost, we mean that the planter of the orchard will get a crop from the worked over trees as soon as from the rest of his orchard. In older trees of course more time will be lost, but seldom more than two years. So it can be seen the importance of utilizing the unsatisfactory bearers instead of grubbing them out.

There is another class of tree which comes under this head ; this is where the root is totally unadapted for the soil ; it is a simple matter to tell this at a glance, as the tree from the time of planting has an unhappy and uncomfortable appearance in this case. When the planter has made up his mind that a mistake really has been made, the only thing to do is to dig them out and throw the trees away at once, and replant the holes with another sort which is growing satisfactorily.

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## ORCHARD IRRIGATION.

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The use and abuse of water is one of the chief factors in orcharding in South Africa. We get so many inquiries on this point that we think it may interest planters to have our views at some length. No hard or fast rule about irrigation of fruit trees can be laid down, the only circumstances under which such a rule would be sound policy, would be if one had an orchard of the whole of which is the same character of soil and the annual rainfall and temperature exactly alike, year in year out. This favoured spot we have not yet located ; when found it can be irrigated alike each year. The African grower is faced with a different problem not only in each district, but often in the same orchard, therefore we think a few remarks as to sound principles of irrigation will be useful.

A tree needs enough water to keep itself in a thoroughly healthy state and to ripen its fruit ; if it does not receive this it suffers, and if the tree suffers the fruit either falls or is imperfect of its kind, and in either instance there is no money in it.

There are undoubtedly many places in the Eastern and Western Province where fruit can be grown without irrigation.

The main points to be taken into consideration are the depth of the soil, the character of the soil, the style of the sub-soil and the position of the orchard.

Too much water is always more serious than too little, it chills the soil, tends to render it infertile, washes out the fertilizer, bringing the alkaline salts (if any) near the surface by evaporation until in time it renders the soil worthless, it also tends to exclude the air from the soil which is as necessary to the roots as the moisture.

On the other hand, as we have said before, if there is not enough water in the soil the tree fails to grow healthily and drops its fruit, or ripens miserable, undersized stuff if any.

There are some growers in this country who preach the gospel of no water, there are others who irrigate copiously as we say, both these advocates may be right or may be wrong *because a certain system suits one farm, do not for a moment imagine that it will suit the next.*

Speaking generally, we would say that with favourable conditions and depth of soil a tree should grow without irrigation, provided there is a rainfall of 20 in. to 30 in., but to take the opposite extreme we have seen stretches of land in this country carrying beautiful orchards without any artificial irrigation and in districts where the rainfall is under 10 inches.

Should the leading of water have to be resorted to, we infinitely prefer the furrow system, draw with a plough, or otherwise one or two furrows along each side of the entire length of trees which must receive water, the distance from the rows of trees that the nearest furrow must be drawn will depend entirely on the size of the tree, a four year old tree we would say roughly at three feet if of course the tree be small, one furrow on each side is sufficient; when the water is turned into the furrow we prefer to let in a strong head if available, and when the end of the roots is reached turn the majority of the water into the next furrows, leaving just enough in to allow the water to reach the far end, and if the soil is deep we like to see the water running so through each furrow for twenty-four hours, for twelve hours at the very least, we are very keen on this point. The majority of irrigated orchards, especially Citrus orchards, are irrigated on a system which is as detrimental to the tree as can well be; the water is led in furrows until close to each tree, then turned out of the furrows and allowed to spread over the ground; when the ground is well covered in say five to ten minutes the next tree is tackled in like manner. We state that this style of irrigation is as bad as it can be, and by no means as economical as its advocate (and it has many) will have one believe. In the ordinary soil such an irrigation will not penetrate the soil more than two feet, and often not more than twelve inches; we do not say that the soil is dry below this depth, because those who practise this system begin soon after the rains are over and keep

it up weekly until other rains come, thus preventing the drying out of the sub-soil, but under this system the deeper one penetrates the soil the dryer one finds it instead of the reverse being the case. The result of this system is that the roots are encouraged to strike up and remain near the surface where they recognize that they receive the most water, instead of striking down deep, in search of the sub-moisture which in most soils is to be found at some depth below the surface. Any fool can recognize that if the roots are near the surface irrigation is needed much more frequently, and if they strike deep and when water is applied it gets down to them it evaporates much more slowly, so that we claim as a practical result of the system of irrigation that we advocate that if carried out correctly one irrigation only every four weeks will be found necessary in place of a weekly one, and instead of a man being always present to look after the water, somebody to go once in a while to see that it has not taken a mole hole instead of the furrow is all that is required.

We again state most emphatically that too much water is being used in many orchards throughout the country, this being the cause of thousands of sickly and unhealthy trees, especially those Citrus trees having an unhealthy yellow appearance. Another reason which tends to make the manner of our usual irrigation still more fatal is the almost entire absence of drainage in orchards. We have seen many pieces of orchards that were being regularly irrigated that needed not water, but the water at present contained in the soil effectively carried off by a system of drainage; in fact, there being already water in the soil in excess, and even the trees suffering from it. We are practical enough to recognize that it is often for one reason or other impossible to irrigate on the lines we suggest, and we are not dogmatic enough to say that a fine orchard cannot be grown without following out the system which we prefer, but we simply wish to point out to growers and planters the danger of over-irrigation and also point out the advantage of getting the irrigation water deep down.

The ideal irrigation would be sub-irrigation, where the water is led in underground drains and where no water is seen on the surface at all. We have seen often orchards growing in a soil which is naturally moist and which has a natural system of sub-irrigation and drainage; it is in such sites trees do so well and thrive with less than 10 inches of rain. Finally we must impress on planters the absolute importance of moving the surface soil with either plough, cultivator, spade or hoe after each irrigation; this is just as important as the giving of water itself; everybody knows how if it is not done the soil after receiving water opens up with deep cracks, through which all the water brought on to the soil is soon evaporated away from the lower depths of the soil.

Leonard Coates, one of the best known California orchardists and looked upon as an authority, writes as follows on orchard irrigation :

" It would be a difficult task for one man to undertake to instruct the irrigation and cultivation for as large an area of land as Colorado, as there are so many different conditions. In order to do justice in the way of irrigation and cultivation of an orchard, a man should first study the character, depth and the underlying conditions, as well as the surface, together with the fall and natural drainage of the land. If fruit growers had realized the danger of over-irrigation while growing their orchards they could have saved to this country in fruit and fruit wood thousands of dollars. In my opinion the severe losses of fruit and fruit wood during the hard winters were in great measure due to over-irrigation and lack of cultivation. While we might have had some losses from the cold winters, had we not applied the water so freely and put in more of our time in cultivation, we would have grown our trees plenty large and healthy enough to withstand the cold winters much better than they did. But, being inexperienced and having abundance of water at command, it was only natural for us to do just as we did and that was to over-irrigate. Now the question might be asked—why were my trees damaged and my neighbour's not when he irrigated fully as heavy as I did? This should be easily answered. As the line of a fence oftentimes separates the character of soil, lay of land and natural drainage, the first thing to do upon entering into the fruit business is to study well the character, depth and lay of the land, and then irrigate and cultivate accordingly. As to time to irrigate, no one can lay down a rule, except to say irrigate when the trees and fruits require it. Trees require very little water after the soil is once saturated, if proper cultivation follows. In my experience, after the damage of two hard winters, I carried my orchard through the succeeding summers entirely by cultivation, and the trees made all the necessary growth. I shall not undertake to do without irrigation this season, however, as the water from over-irrigating during previous years has had time to evaporate and soak through the deep soil. From this test I am convinced that less water and thorough cultivation is more beneficial to tree and fruit than too much irrigation and little cultivation. Orchards on the western slope should be irrigated every season, but judgment should be used as to the number of irrigations and the length of time the water is allowed to remain on the land. Some soils are porous and have good drainage. Such soil is in no great danger of being over-irrigated, but land with a very deep soil, such as we have in Grand Valley, and lying very flat, should be irrigated with great care and should be well cultivated in order to feed the surface roots from the moisture below. Water should be kept off the latter part of the season in order to allow the wood to ripen well before winter, unless the trees should be heavily laden with fruit, when it will require some additional water to fully develop the crop. Fall

irrigation, after the wood has ripened, is very good, as it has the entire winter to soak away and leave the soil in fine condition for the trees to put forth the necessary growth early the next season. My practice of preparing land for irrigation is to plough a deep furrow for the water. I favour this plan in order to prevent flooding the land. I want to keep my surface as dry as possible, in order that I may get on to the land more quickly with horses to cultivate it, as this is the method by which we retain the moisture in the ground. If the furrows are allowed to remain uncultivated any length of time, they will crack open, then I think irrigation will have done more harm than good. This has been one of the reasons that we over-irrigated in years past. We irrigated through furrows, and in cultivating did not entirely fill them. In a few days they would crack open, and the hot sun and wind would soon dry out the surface, so that we would be compelled to apply the water soon again, therefore getting our land soggy and sour by too much water. Irrigate sparingly. Keep the water from the surface and feed the surface roots by cultivation from moisture below. This might be called sub-irrigation. This rule holds good for general agriculture, as thorough cultivation is beneficial to all plant life. If fresh air is beneficial to human life, so it also is to plant life, and this pure air cannot be injected into the soil, if flooding is practised. I am satisfied after several years of experience in Colorado that surface cultivation is one of the cheapest and most effective methods of checking excessive evaporation. This fact does not appear to be well understood in this State, and many of our irrigators have an important lesson yet to learn in this regard. Irrigating water can never take the place of cultivation. As we all well know, the custom of many irrigators is to apply large quantities of water to growing crops, and the water makes a paste of the top soil. In less than thirty-six hours the moisture in this top layer may be evaporated, leaving it hard and baked. Under such conditions it is astonishing how rapidly the soil moisture is converted into vapour. It is as if millions of tiny tubes extended through this top crust to suck up the moisture contained in both the soil and subsoil. If this process is long continued, there will be found little moisture within a foot of the surface.

In the general system of orchard cultivation in California, two evils are to be guarded against, too early ploughing of the land, before there is sufficient growth of weeds, or early cultivation to keep down weeds, and a system of irrigating which keeps the land soggy at one time and with a hard crust on the surface at another.

Late, second ploughing is also to be discountenanced, one good ploughing in early spring, followed by the disc or the tooth-harrow, being better suited to aid conservation of moisture, as well as the constant adding to the land of humus and nitrogen."

## MANURING ORCHARDS.

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We are only going to deal in a few words with this important matter, recognising the fact that almost always and everywhere throughout the country trees planted will need manure ; we will simply say that we are very much against such manure being applied at the time of planting the trees—our general principle being that we prefer to plant with no manure to enable us to form an opinion as to what the soil will do unaided, as should manure be applied at planting one can never form any opinion should the growth be satisfactory as to how much is due to the application of the manure. and as to how much natural fertility there may be already in the soil ; one is therefore a bit fogged in the intelligent application of the manure in future years. There are just one or two considerations as regards the time of application. It is recognised of course by any novice that manure of whatever kind is of no value to a plant unless it is brought into solution by aid of water, either through the medium of rains, or by it being led in, therefore should your orchard be one where the trees are grown without irrigation, the manure must be applied during the rainy season, if it is a very soluble manure, as guano, sulphate of potash, nitrate of soda, &c., a few inches of rain upon it will bring about the desired effect. If it is not so soluble as Thomas Phosphate, bone meal of coarse grade, &c., it will require more water when it is necessary to get early results, therefore we would say, use your judgment as to the date of application of the manure, according to the particular stuff you wish to apply.

Speaking as to the sort of manure we can only lay down as a sound principle that if one wants to force growth, nitrogenous and potash manures will do it, and if one wishes to force fruit, potash manure and phosphatic manures should be used, and nitrogenous manures carefully avoided.

In applying don't give it to the stem of the tree, manures can be absorbed by the tree *only* when entering through the fine feeding roots, the thick roots at the base of a tree do not assist to feed it, they are unable to take in either sustenance or moisture.

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## ORCHARD CULTIVATION.

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It is thoroughly recognized nowadays that without cultivation and thorough and continuous cultivation successful orcharding is out of the question. The effects of cultivation are as follows : The aëration of the soil ; (2) the conservation of moisture ; (3) the destruction of weeds.

Each of these grounds for cultivation has a vital effect on the crop, the aëration of the soil is as important as moisture. Soil which is allowed to remain hard and compact gets positively dead. We have seen many instances where old roads in certain classes of soils have been ploughed up and which would grow nothing for two or three years, in fact until life was again put in the soil from thorough aëration.

The conservation of moisture is effected by continual cultivation in this manner, it is a well recognized fact by all agriculturists that moisture received into the soil either by artificial application or by natural means for a certain depth down, rises up again by the capillary attraction of the sun's rays acting on it. The process is a continual one of pumping going on from below, through the cells in the soil, which readjust themselves after each moving of the surface soil for this purpose, therefore if the cultivator is kept going during the dry season, the capillary cells are being continually broken and it takes some little time for them to readjust themselves, and allow the under moisture to be drawn up through them, in this way the moisture is locked up in the ground, and the only manner of its escaping is through being drawn up by the roots of any tree or plant, and being evaporated off through the leaves.

It is for this reason we mention the third advantage of cultivation, to wit, the destruction of weeds, as every weed growing is drawing up moisture from below and giving it off into the atmosphere. You yourself can readily see this almost any time in your orchard, especially in Citrus trees which have been badly irrigated. Take a very hot day, and at midday you will see the leaves drooping and looking as if the tree needed water, whereas early next morning you will find the same tree which in the meantime has not had a drop of water looking perfectly fresh. Why ! simply because the hotter the sun the more rapid the evaporation going on through the leaves. On a very hot day unless there is perhaps an excess of moisture in the soil, the evaporation will be going on at a quicker rate than the roots can take it out of the soil, hence the drooping of foliage, whereas in the cool of the evening evaporation slows off, and by next morning nature has balanced itself, resulting in a healthy normal condition of the foliage.

We have heard many people say that grass and weeds conserve moisture in soil, and insist on its being so. They state truly that if you take a very weedy piece of land, and on a hot day pull

out the weeds you will find the surface nice and moist. Quite right, it is just as stated, but the presence of the growing weeds acts as a mulch for *the immediate surface*, but at the same time if you test the amount of moisture contained in a square foot of soil at, say 12 inches below the surface after a month's absence of rain the most sceptical will be satisfied. (1013A2)

The evaporation going on every day through the leaves of a ten year old fruit tree is something enormous, showing how foolish it is to state that trees will grow without water unless it has been proved by the orchardist having actually done it by employing the system of thorough cultivation in the dry weather, or by recognising the presence of conditions such as are described herein under the head of "Orchard Irrigation."

In the parts of Africa where a winter rainfall is received, we consider that a ploughing when there is an opportunity during the rain, and another cross ploughing towards the latter end of the rainy season is enough, this to be followed by the necessary harrowing and bi-fortnightly cultivation up to the end of December; we do not consider continued cultivation necessary after this date unless in the case of late fruit. In the parts of the country where a summer fall is received, we would say *reverse the order of things*. You cannot of course, as any practical farmer knows, get on your land a plough or work it in any way when it is in a wet condition, nothing will sooner tend to make it infertile, but when you can get on to it get the weeds under, and after the rains are over keep the cultivator going, as it is quite necessary for growers who have summer rain to retain enough moisture in the soil to give the tree the necessary start the following spring, and hold it healthy until the advent of the early summer rain.

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## ORCHARD IMPROVEMENT.

(By LEONARD COATES, of California.)

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"The soil in which most trees have been planted is good, and often very rich, and to this, with the sunny climate, may be attributed the fact that many orchards look as well as they do," rather than to any great care or skill on the part of the orchardist. So observes Leonard Coates in the "San Jose Mercury," and he continues: Given a stronger tree and a healthier root, the bud taken from the most perfect specimen, and the result would have been comparatively better.

Continuing this same idea we are brought to a study of the influence of stock on scion, or scion on stock. That there is an influence, and a marked one, is conceded by all authorities.

Indeed, any observing orchardist may see the evidence in his own orchard and all nurserymen are still more familiar with the details.

For instance, we may have the best stocks, and yet the budded or grafted tree on these same roots will vary much as to growth and vigour. The Japanese variety of plums will make an immense growth on either plum or peach root, while the Bradshaw, Yellow Egg, etc., grow feebly in comparison. A vigorous top growth always indicates a correspondingly strong root growth, and anyone at all unfamiliar with these things would be amazed at seeing the root of a Burbank and of a Bradshaw plum tree, though prior to the budding or grafting process, both stocks or roots were exactly the same.

Without illustrating further, for these are horticultural facts, the question naturally arises, how to best apply this knowledge for practical purposes. There are two ways: One is for the nurseryman to supply trees grown on the best roots, budded from selected trees, and where the variety is known to be of feeble habit, to double work. As an example of "double working," Dr. A. Sharples, of Goshen, Oregon, believes the Tennant prune to be the best plum stock for that State, particularly as to cold resistance. He has found that the Tennant everywhere was uninjured during very severe freezes which destroyed many trees of other varieties. Those who have planted Tennant trees in California must have noticed their exceptional vigour and hardiness as compared with other trees, and this variety on peach root from seedling peaches, top-worked with any feeble growing varieties of the plum family would in all probability result in a tree of great vitality and productiveness.

The second way is for the orchardist to plant his orchard with whatever varieties are the best growers, let them be Tennant prune, Kieffer pear, Spy apple, or anything else—and top-graft them himself in a few years, or in blocks, as he wants them. There is an additional advantage in this as the orchardist would have more time to decide as to what varieties were best, and the stocks would be planted and growing, so there would be little loss of time.

The Robe de Sergent prune in California is not altogether satisfactory, being an uncertain cropper, and it is also complained that the tree is tender. In the writer's orchard were a few trees of Italian prune on peach root; these were grafted with Robe de Sergent scions, and the result shows trees much larger and stronger than those on Myrobolan root, and not double worked, and what is even more valuable, they have borne regular crops. This variety will not unite with the peach, but from the above experience it would seem that it needs a peach root, but must have an intermediate plum stock of strong habit.

There are several fruit growers in other States who believe in and practise this plant breeding. Professor L. H. Bailey is planting Spy as the foundation for his apple orchard. S. A. Heiges uses Ben Davis for the same purpose, top-grafting on to it all weaker varieties. Professor Van Deman recommends the same practice, and has planted orchards in Kansas the same way. S. D. Willard, in New York State, one of the largest plum growers in the country, plants Lombard entirely as a stock, and top-grafts all varieties on to it. George T. Powell uses Kieffer as a stock for pears, and by this method Bosc, and excellent pear, but one which is never recommended because of its poor straggling growth, may become well known; and so on with many varieties of all classes of fruits which are poor growers.

There are certain varieties which never make good trees, and no amount of care or manuring will remedy the defect; the only remedy is double working—give them a good foundation. There are other varieties that are said to be more or less self-sterile, and which need to be planted in the near proximity to other varieties. Give these more vigour and strength and the chances are they will also become better bearers."

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## WHAT TO DO WITH YOUR OLD ORCHARDS.

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It is certainly an important matter for those who are going in for orcharding to consider what is best to be done with the old orchards which are standing most probably on the farm. A number of planters consider that the best way of settling the question is to dig them out at once—generally their reason being that they are in a filthy state, and composed of varieties of no market value and a nest for all sorts of pests. We must say as the result of our experience this is not our opinion. An old orchard on a farm is valuable in many ways.

Firstly: The trees can be cut about and can be used as a practice ground for the orchardist, who if he is a South African has many new ideas from abroad to put into practice and experiment with and satisfy himself upon, and if he came in from abroad with knowledge he will find such trees of great value for testing how far his former practice can be carried out in this country.

2nd. Because if such trees are of worthless varieties they can be readily top-grafted to sorts which have been proved to thrive and pay well, and more than this, and most valuable of all uses to which they can be put, the orchardist can top-graft on to them any varieties which *he may have planted*, or which he thinks will be a payable proposition to plant in his part of the country, and he can bring such scion into fruit in two or three years, thus testing the value of a variety in the least possible time and perhaps avoiding the risk of planting out hundreds of young trees of wrong varieties, and if he should have planted them out he can prove to his satisfaction that they are unsuitable and can get the young orchard grafted or budded over without loss of time.

The writer cannot too strongly emphasize the value of such experimenting, in fact of such great importance do we consider the earliest proof of the value of varieties in different districts in a country like this, that exhibits an *entire absence of data*, that we consider that if feasible it should be a matter for Government consideration and aid.

To put it clearly, that the Government should with permission take possession of old worthless orchards scattered through the country, have them worked over by top grafting by experts to such varieties as it is considered would be of commercial value to such district, such experts to have a thorough knowledge of the bringing into early bearing of top grafted trees. One man could supervise a great number of these small orchards scattered up several hundred miles of railway, and the result would be farmers could select their varieties to be planted from the success or failure of the tests. We have ourselves, we consider, saved

thousands of pounds to our customers and to the interests under our charge by making such experiments covering nine years. We have ourselves got thousands of trees which were of worthless varieties, the majority of them old orchards, which have been worked over by top grafting, and which we feel certain now will pay us handsomely.

3rd. Because he will be able to use such trees for testing the different washes which an orchardist finds necessary, he will then be in a position before his younger trees come into bearing to know the most suitable spray to use and also to get a fair knowledge of to what extent he can prune to secure a crop.

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## A BASIS ON WHICH FARMERS CAN DECIDE WHETHER TO ADD FRUIT GROWING TO THEIR OTHER SOURCES OF INCOME.

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We are repeatedly asked for advice in all sorts of out-of-the-way places as to whether a man should plant fruit trees.

We try here to give a lot of general information about growing prospects, outlets for product and particulars of varieties, which if carefully read should assist the individual to form an opinion. Then the principle we imply is as follows, it rests of course with each intending planter to decide whether it is a sound one in his case.

It is not in our mind a question as to whether we can grow good fruit, but the question to put is *whether off a certain piece of land one can make more money by planting fruit trees of sorts than by the present style of utilizing it.* In hundreds of instances within our personal knowledge, and there must be thousands outside of this, the answer must be in the affirmative as regards planting fruit trees, as land suitable is lying idle, bringing in not even a *sovereign* a morgen, and perhaps the household is even without fruit for its own consumption, and fruit trees at £5 per 100.

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## THE INITIAL DIFFICULTIES OF ESTABLISHING ORCHARDS IN SOUTH AFRICA.

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The South-Western District of the Cape Colony, covered by an annual winter rainfall, is probably the easiest country in the world in which to establish a young orchard; during our nine years' residence we have positively seen no difficulties to encounter worth mentioning; we shall therefore let it pass. But it must be remembered that throughout the greater part of South

Africa we have summer rains, and the ground at the planting season, *i.e.*, during spring, is often dry and hard, and that should the trees be planted under such conditions without the necessary attention, they would probably die. During our trips to the East much was heard on this score, and we have thought over the matter, and what should be done if placed under the same conditions. The advice we give to our Eastern friends, and also their fellows in difficulty, which is offered with all due deference, would be as follows:—Have your land prepared during your rainy season by a thorough deep ploughing and sub-soiling if possible (in fact, if one is going in for orcharding in the East on the deep, rich, rolling lands so abundant there, a subsoil plough might *most certainly* be obtained), followed by a good harrowing, and later, several stirrings of the soil by the running through of a cultivator.

When the following dormant season for fruit trees comes round, the only proper season, by-the-bye, to remove deciduous trees, get your trees, and have them planted at once, presuming, of course, your soil is in condition for planting. When the soil has been carefully packed around the roots, and the hole has been refilled within nine inches of the surface level, empty a couple or more buckets of water into that hole, and when all the water has sunk out of sight, and *not till then*, have the hole filled up with the remainder of the perfectly dry soil, which has previously been taken out. Every tree should be similarly treated.

We would suggest, to facilitate watering, that a low sledge on two runners be made, on which could be stood one or two barrels of water, and which could be pulled through the tree rows, by a horse, ox, or mule. The expense would be almost nothing in a 10 to 50 acre orchard, if systematically carried out, and each watering would, we feel satisfied, keep the tree in a thoroughly moist condition for ten or fourteen days. The secret of success would be, of course, *the removing of the surface soil at each such irrigation and its replacement in a perfectly dry condition*, this acting as a thorough mulch.

We are satisfied such treatment would result in finding the tree at the advent of the first rains in a healthy growing state and ready to simply jump ahead in the warm, moist atmosphere which accompanies them.

We visited the district of Albany on behalf of the Government in June, 1895, and the country was suffering from a so-called drought. This drought was simply the dry season of the year, when the whole face of the country is dried up and vegetation withered. We have an exactly similar season in California, when in a square mile of veld not a blade of green grass or a green weed is to be found; but there we call it the dry season, and as far as orcharding is concerned its ill effects can be circumvented in California by cultivation, *i.e.*, constant tilling of the soil, and we are certain the same treatment here will give the same good result. We remember testing certain hillside land

which had been lying fallow on Mr. Stirk's farm, and it was in a beautifully moist condition, and would have carried an orchard most assuredly.

Perhaps it would not be out of place to give our Eastern friends some ideas of the difficulties to be encountered almost annually on some lands of the celebrated St. Clara Valley, in California, which we may here state last year shipped 29,000,000 lbs. of fresh fruit, 17,000,000 lbs. canned fruit, and 42,000,000 lbs. dried fruit.

We speak with some little authority as an erstwhile contractor for this class of work. Let us take one job out of several which came under our own eyes during our last season; a 5-acre block, the contract price to dig the hole and plant the tree was 6d. per tree; long price you will say, but nevertheless money was lost on the job.

The soil, a rich, black, stiff, clayey loam, that is there called "adobe," was so hard that we could not get into it even with picks, so the only course open to us was to dig the holes 6 inches deep, then fill them with water from a barrel, wait until the water had sunk and softened a few more inches, and so on, *ad nauseam*, until the required depth had been arrived at. The trees were planted with a couple of buckets of water added, and they grew. One is altogether too much inclined to imagine that fruit-growers in other countries, who have made a success of it, have had no difficulties to encounter, but we think this will generally be found to be not so. In fact, it is safe to say, that the greater the difficulties to be surmounted, the greater the success, as the initial energy displayed is only a foreshadowing of what will be displayed in the future.

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## THE GENERAL TREATMENT AT PLANTING AND DURING FIRST SEASON'S GROWTH OF A YOUNG ORCHARD.

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If possible, one should have had the land prepared the year previously, and lying, in summer, fallow. This should be more important in districts which get their rainfall during a period when a deciduous tree is in an active state of growth. We will presume the ground is in a thoroughly clean and well-pulverised state, or as nearly so as the frequent ploughing, cultivating, and breaking of clods would allow. On arrival of the bales, or boxes, as the case may be, they must be opened at once, even if it were the morning, and one intended beginning planting the same afternoon, one should have them all layed in by the roots, in a trench, which should be dug on, or near the ground to be planted; if the soil were dry, this laying-in should be done where one is able to allow water to be turned into the trench. In doing this work, take care that all the roots are well covered with the

soil. Should the varieties be bundled up, all strings must be cut and the bundles opened, prior to covering the roots with soil, taking care that different sorts are carefully marked out, so that the varieties do not get mixed at this early date. At the unpacking the trees should be counted and the nurseryman's invoice checked, and then is the time to lay complaints, should there be any.

We will presume that on arrival of the trees the ground is not yet staked out, nor the holes dug; the staking out is of course the first work. The distance generally recommended for standard trees is from 18 feet to 22 feet apart. Dwarfs, 6 feet to 8 feet apart. The tools required are a square, which can be made of flooring board, sawn down in middle, each side 10 feet long. A setting-board, which can also be of the same material, 5 feet long, and is made as follows: find, and mark the centre of the board, and also mark exactly 2 feet on either side of this centre, then saw out 3 triangular notches on these marks or lines, each notch let one inch into the board. And a copper wire 210 feet long (this, by-the-bye, should be kept rolled up upon a frame), which any tinsmith can make, with a lump of solder fixed at every exact 20 feet, leaving 5 feet at each end, to which ends ring for holding it should be attached. Two men are needed for the staking, whom we will style A and B. The first thing to do is to find a right angle, taking in as much of the block as possible. This is got by using the square, the sides of which are long enough to enable one to sight the lines the whole length of the field. Having decided where the corner angle is to come it is at once secured by A placing the square on the ground to the lay of the block. The two sides of the base square can now be easily drawn, by A remaining at the angles and sighting along the square for B, who with a bundle of 6 feet reeds walks along the projected line, placing one every 30 or 40 yards, which may be pushed firmly in after its correctness is determined by A. This line can be sighted out the entire length of field by so placing a succession of reeds. The second line of the base angle may in the same manner be sighted out. The right angle is now secured, which form the two sides of the base square. Next the wire is stretched along one of the lines, both men having previously shouldered a bag of stakes, or reeds, say 12 inches long, which should have been previously dipped in a thick lime, to their centres. After the wire is fixed, both walk towards the middle, at each lump of solder pushing a stake into the ground for three-quarters of its length, the white-washed end uppermost, and always on the same side of the wire. When all are staked, the wire is moved along onward, until the whole length of one side is staked at exactly 20 ft. apart, the other side of the angle is then similarly staked, beginning, of course, from the first stake set, which will be the corner one. The wire will allow for the marking out for 10 trees at once; the men therefore move down this latter line to the tenth stake, bringing the wire parallel with the first line

staked. The angle is then brought up to the tenth peg, and another line is sighted, and marked with 6 feet reeds parallel with the first. The correctness of this parallel line should now be tested by the wire in, say, two places, the angle being placed by A in each case square with the first line drawn, to enable him to know that the wire is stretched at a right angle: If the sighting has been correct they should have a perfect parallelogram. Upon A assuring himself of this fact, the wire is stretched along No. 3 line, and it is staked out, as before, its entire length. A and B then bring the wire back to the two opposite stakes parallel, and twenty feet from the second line, they then stretch the wire across and both walk towards the centre, staking at each piece of solder, and always taking care to place the stakes on the same side of the line as those already set. When the whole parallelogram is staked, it can be used as a base square and the rest of the piece can be worked from it by a continuation of the same process, or by sighting each row. Two men should stake out, in this way, from ten to fifteen acres in a day. When the whole piece is finished, and it is better to finish before planting, the correctness, or otherwise, of the work is at once apparent by the white line of stakes. Great care must be taken that the wire does not become crinked. Now A must take the setting-board, as already described, and having slung over his shoulders a bag of stakes, he places the centre notch of the board to the first stake and after placing one foot on the board to hold it firm, pushes in two other stakes, taking care they are driven squarely into the ground in the other notches, the original central stake can now be withdrawn and ready for use at the next hole. The first hole is now ready for the digger, who makes his hole in the middle, between the two stakes, throwing the upper soil to one side, and the subsoil to the other side, and in each case just by the hole; care must be taken by the digger not to move the stakes with his feet. When the hole is complete it is ready for the planter, who comes along with a setting-board exactly similar to the one used for staking, and after selecting a tree from those which are presumably beside him protected by a wet sack, and kneeling down with one knee on the board, the tree is brought into the central notch, the roots are carefully spread out with the hands, and what was the surface soil is gently shovelled in; the planter taking care it is well worked among the roots with his hands. When sufficient is worked in to hold it firm, with one hand holding the tree in an upright position, he rises, and the men shovel in the remainder of the soil, the planter retaining his hold on the stem of the tree to keep it upright, at the same time treading gently round, while the soil is being thrown in, to firmly fix the tree, which we may say should be planted at the same depth as it has formerly stood in the nursery. The holes cannot be dug too big or too deep; but before beginning planting enough soil should be replaced, and

highest in the middle of the hole, to bring the level about right for the roots to be spread out by the planter. Three men will be found the best number to plant: two shovellers and a planter.

Should manure be applied at planting, it should either be put deep down below the roots, or it should be afterwards spread on the surface of the soil around the tree. After planting deciduous trees of every variety, excepting walnuts, they should be cut down 15 or 18 inches from the ground and all the lateral branches should be cut off close to the stem, but not so close that the buds that are often to be found at the base of such lateral (*i.e.*, against the main stem) are cut off, as should this be done no bud can force itself out from such place, and should all such buds be carried away in removing the lateral, a badly balanced or dead tree would result.

All young trees must be carefully examined about every two weeks during the first three months of the first season's growth, and all buds making a growth along the lower ten inches of the stem should be rubbed off with the fingers, as the object in view is to force out the laterals from the upper buds of the single stem. In order to make the orchard of a uniform shape the rubbing off of these buds requires to be done intelligently; on arrival at each tree the buds that are already forced out, or likely to be forced out, should be noted, the object in view being to allow three or four of such buds only to remain, and these should be retained in such a position as to evenly distribute the future main limbs around the tree so that the head shall be thoroughly balanced.

Another point to be noticed is that the nurseryman's labels, which are very often carelessly overlooked, are not eating into the tree; if they are tightening they should be freed, in fact it is better at as early a date as possible after planting to make a ground plan of all orchards and take off the labels; a constant source of danger is thus removed.

The main work in every orchard during the first year is the working of the soil by ploughing and loosening with a cultivator which should be constantly going in order to keep the trees free from weeds, &c. Should irrigation be needed it must be done with caution, and after every such irrigation the soil shall be worked with the cultivator. The soil *must never* be allowed to cake round a young tree, one must *also never forget* to trim the roots of all trees before planting them. They should be cut from the centre outwards with a sharp knife.

In conclusion, keep a close and continuous watch over the young trees for insects, caterpillars of sorts, and calandras, &c., &c.; should they be found in any quantity a daily hand picking will be quite necessary.

## GENERAL REMARKS ON PRUNING.

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We are frequently asked "What is the best time to prune?" Our reply is always "When the trees are in a dormant state, roughly from the 15th of June until the end of August." But at the same time we must add that cutting a tree at its different stages of growth has a different effect, and of late years considerable departure has been made from this formerly, I believe, cast-iron rule. In California (and we have seen it done with equal success here), it is customary soon after the harvesting of the crop of apricots to cut away the entire top of the tree a few inches above the place where it will later have to be pruned; this results in a severe shock to the system, giving the flow of sap a strong check just at a time when it is not in vigorous flow, thus tending to the formation of fruit buds, as it must be remembered that these are more readily formed when the sap is flowing sluggishly. Any observer will have noticed a sickly tree is almost invariably well set to fruit, and also that trees growing in rich soil takes longer to come into bearing. This is by reason of the difference in vigour in the flow of sap.

Then again we hear a great deal nowadays about summer pruning and the multitudinous advantages gained thereby. We are perfectly satisfied that under the conditions that we grow fruit in South Africa a summer pruning is more an element of danger than of benefit. In the west we have our dry hot summer, and with moisture either placed there by irrigation or naturally in the ground, the uniform result is a strong vigorous growth of wood. Now, should one begin summer pruning such trees it means simply a temporary check, and then another new growth which is of absolutely no advantage, *but if the right time is selected*, and it can *only* be determined on each season by careful observation, and is just at the time of autumn or when the flow of sap is slowing up, a slight thinning out of the new top growth to allow the sun to penetrate all parts of the tree, and a careful shortening in of the laterals on which fruit will later be carried will undoubtedly tend to the formation of many fruit buds. This style of autumn pruning applies to apples and pears only.

We should never touch either the peach or plum during the growing season except to cut clean away the water suckers that almost invariably grow up as the result of keeping the centre of the tree open. We notice on the Continent, in France, Italy, and Spain, and wherever fruit is at all carefully grown, the main idea, whether it may be a peach, apricot, pear or plum, is to *keep the tree well open and not to have too many main limbs, this appeared the key to all their pruning*. The result being that after the tree comes into full bearing there is very little more cutting to be done.

We have seen nothing in this country to lead us to advise planters to be non-pruners. In fact, the result of our observations lead us to believe that this is pre-eminently a country in which the correct, or otherwise, pruning of an orchard will be an important factor in its ultimate success or failure. The "Low head" system of pruning is the one, we are convinced, is best for here.

Firstly : Being a country of hot suns, this style best shelters the stem and keeps the soil around the tree cool.

Secondly : Take the undoubted advantages derived from picking the majority of the fruit from near the ground.

Thirdly. The minimum of danger which such trees are exposed from the force of the strong and gusty winds, which are the orchardist's *bête noir* in many parts of this country.

Fourthly. The firm and solid foundation one is able to give a tree grown on these lines are important points in a climate like ours, where trees carry, very often, maximum crops.

The well-spread foundation thus gained is most important in other ways ; it enables the laterals thrown out from the main limbs, of which latter, by-the-bye, take care there are not too many, plenty of room, to be annually or where necessary shortened in, and in turn throw out other side shoots, which will bear fruit over a number of years ; and being carried near the main limbs, will be practically safe from the winds, and the flow of sap there, *i.e.*, in the main limbs, being strong, the fruit will be of good size and quality.

I have treated at some length this important matter of foundation-laying in another paragraph.

The conditions under which orcharding is being practised in South Africa are very diverse, and the details of successful pruning will undoubtedly differ ; some districts will require more bearing wood being retained, others less ; these details must be left to the judgment of the individual pruner ; this is no rule-of-thumb job, but brains, guiding a knife, or pair of pruning shears, as the case may be. The object in view always being a continuous succession of crops of good quality fruit, covering the greatest possible number of years from a given tree.

All dead and diseased wood, not forgetting dead fruit spurs, should invariably be removed at each season's pruning.

Also all cuts, except the cuts on the thin laterals and spurs, should be painted over ; any materials will do, waste or good paint, tar grafting, wax, shellac, and in fact any material that will exclude atmospheric influences,

In implements try the best, *i.e.*, most expensive, shears you can get. Swiss makes and shapes are the best, and they should be supplied with a spare blade ; a pair of such shears will last years.

*A sine quâ non*, as far as thorough work is concerned, is the California Pruning Saw. A frame saw, which should also be bought with a spare blade. These are stocked by the leading ironmongers in Cape Town and elsewhere.

## REPORTED TENDENCY OF FARMERS, WHO AT ONE TIME BELIEVED IN IT, TO NOW NEGLECT PRUNING.

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Several thinking Fruit-growers have remarked to us the last year or two that there is a tendency among growers, who took up the pruning of fruit trees some few years ago, and who after keeping it up on the lines advocated by experts are inclined to now condemn it as tending to prevent their trees coming into bearing; to such we would say, do not under any circumstances make up your mind that pruning in Africa is either a mistake or is unnecessary; we attribute this result to one of two causes, either the grower has started pruning a tree which was perhaps four to six years old, and was either already in bearing or was just coming into bearing, or the planter has pruned his tree from the time of setting, and he expects to get his fruit too soon. In the first of these instances beginning the necessary cutting when the tree is already established will certainly have the effect of retarding its coming into bearing, and we consider from the result of our own personal experience in many different classes of trees, and we have had it in thousands of cases, that it is a mistake to do on such trees a heavy cutting out and heading back. If it is necessary to tackle the shaping of such trees, and it generally is so, do the requisite opening out and heading back in one year, and after that for the next season, do very little cutting indeed, doing (if anything but a peach) almost all that is required in the first summer, so that the winter cutting will be almost nothing, as one must remember that nature preserves a balance between the roots of the tree and the head, which she takes care to maintain; therefore, if one goes on everlastingly cutting at the head, nature will continue to push out new wood and throw off the blossom without their setting owing to the strength in the flow of sap. No! make your heavy cutting in one year to bring the tree into some shape and for bearing and for remaining some years in an orchard where the plough and the cultivator must be worked to economize the labour of keeping clean and loose. In the matter of the second case, growers expect too much from their tree, when young. We see on referring to Australian Government reports that some few years ago, there was a great boom in fruit tree planting, but that many growers have thrown up the sponge, the majority because they *are too impatient to get returns*, and considered that because their trees were not bringing in money in two or three years, that their orchards were not a success, and that trees would not prove satisfactory in their district; nothing could be more erroneous than views such as these. The practical Fruit-grower recognizes that he *must* wait a certain length of time for each class of tree to come into bearing, and he waits and waits, being perfectly satisfied so long as his

trees showed a thoroughly healthy appearance, he accepting this as the natural increment as a result of his time, money, trouble, and brains. Only a few weeks ago we were asked to accompany the Chief Justice through his orchard in Drakenstein. Among other trees, he had over 1,000 pears planted five years ago; he was not satisfied with the growth and bearing of these, the Bon Chretiens being the only variety that was carrying a small crop. We at once recognized that the trees were doing very satisfactorily and told him so, at which he seemed quite relieved; we mentioned at the time that we had planted several thousand pear trees on our own place and that if they were doing as well at the same age we would be perfectly satisfied. It would well repay the Government to have a man going round continually who had an intimate knowledge of what to expect from the different classes of fruit, to point out to orchardists where trees are in bearing whether the growth be satisfactory or no, and whether the general health and appearance of the orchard be commensurate with the money and work put on it.

In conclusion, we would say that Farmers should under no circumstance neglect pruning, but that cutting is a rational operation and is done before the tree is expected to bear, with the sole idea of shaping the tree to enable it to carry fruit, and after the tree comes into bearing, with the idea of retaining it in fruit covering a long lifetime.

We think that it will not be out of place here to give a table showing about what date the principal classes of fruits begin to come into bearing, it may be a guide to growers.

*Apples*, on Spy or Communis from Rome Beauty, which bears in the 3rd year, to Spy which bears in the 8th, dependent on variety, or Paradise, 2 years earlier so far as we know through all varieties.

*Pears on Pear*, from Bon Chretien in the 4th year to Duchess d'Angoulême in the 7th.

*On Quince* in our experience hardly any earlier; this stock *should* however save a couple of years.

*Peaches*. In the 3rd year, often in the 2nd.

*Apricots*. In the 4th year.

*Plums and Prunes*. Domestic, in the 5th year.

*Japanese* in the 2nd year.

*Cherries*, in the 6th year.

## THE PRUNING OF YOUNG DECIDUOUS TREES THE YEAR AFTER PLANTING.

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One can treat of all varieties here under a single head, as the object now in view is solely to lay the foundation of the tree, and whether the fruit will be carried on the old wood, or on the growth of the last summer, is a matter which one has not to take into consideration until next year. This pruning is therefore the most simple of actual cutting operations, but at the same time such cutting makes or mars the future tree.

The object in view is to spread the tree, and lay an open foundation. Should the three or four shoots, which we have said must be retained, be in their right places, all one has to do is to cut them back to a third or a quarter of their length, in every case cutting to an outside bud should the limb be growing too upright, and to an inside bud should it have a too spreading tendency. Bear in mind that the shoots leaving the stem at an obtuse angle are much to be preferred to those forced out at a very acute angle, as when the tree is large, carrying a heavy crop of fruit, there is great danger of an acute angle limb breaking clean off from the main stem, disfiguring the tree for life, and also lessening its bearing capacity. The obtuse, tangled shoots will often be found to take an upward turn, about nine inches from the main stem. Here is a good place to have them off, cutting to an outer bud; but should this upward tendency begin too far from the main stem, cut it short of it and to an inner bud. Let us now take an opposite extreme; a tree which has only forced out one shoot. If this be a perpendicular one and near the top of the stem, cut it down within six inches of its base, and make your foundation the following year from the shoots formed from the buds on this short six inches. We may add, that this throwing out of one shoot only is very seldom seen on a properly grown and carefully handled nursery stock, and it is a matter which should always claim the attention of the intelligent buyer. Should the shoots retained be not as well distributed round the stem as could be wished, they can now be spread by the insertion of a small wedge, sharpened at both ends, and made of a previously-cut-off shoot. A small notch must be cut in the side of the two shoots to be spread, at the point best calculated to bring them to their required individual positions. The wedge can then be inserted, and will remain quite firm until the shoots have accommodated themselves to their new position, which they will henceforward retain. An acute angle can also be changed to an obtuse angle, by the insertion of a similar wedge between such shoot and the main stem, thus forcing it outwards. All cuts should be painted over with waste paint, shellac, or some other preservative.

## NOTE.

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Since writing the following directions on the pruning of the different classes of fruits which we did some four years ago, we have seen reason to somewhat modify our recommendations. We consider it may be of advantage to growers, to see just where such modifications and alterations are. The result of our latest four years' experience affect the former instructions, we therefore in each instance place our modification in a separate paragraph in each class direction, which we think need modifying and printed in italics in the original instruction.

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## THE APPLE.

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1896. Taking the tree at the second season from planting, one finds that each of the laterals retained after last year's shortening have thrown out two or more long shoots. If any of these are crowding others, cut them clean away, retaining only those which are tending to evenly distribute the limbs on the foundation. Those left should be shortened to a third of their length. *Any of the laterals which have been thrown out during last season's growth must be shortened into two or three buds.*

The apple bears on the spurs thrown out, either directly from the main limbs, or from the shortened-in laterals, and also some varieties at the terminal buds, and the object in pruning is to encourage the formation of fruit-buds on these spurs. The main upright shoots of the apple should not be topped much after the second year, as the foundation should now be firm and stocky. Only such shoots as may crowd out others, or overlap, must be cut away, and the laterals must always be either shortened-in to form spurs, or cut clean out if they crowd one another. This, of course, at the discretion of the pruner. The fruit-buds are the large prominent thickset rounded buds, distinct from the smaller, less prominent buds, lying close to the branches.

1900. Don't shorten-in the laterals to two or three buds, leave them say six inches in length, and don't keep up this constant heading back and shortening-in of laterals—when the tree has got a good sturdy growth, say in two to four years, dependent on the variety, let it rip, cutting out those branches only that interfere with others; it will throw itself into fruit quicker left practically alone, and when once in fruit judicious cutting back and shortening-in of laterals can be recommenced.

## THE PEAR.

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1896. The fruit is carried by the pear on the spurs thrown out from the wood of more than one year's growth, and in isolated cases (much less frequent than with the apple) at the terminal buds. No account should be taken of the latter mode of bearing, but one's entire attention devoted to securing the fruit on the spurs.

On taking over the pear at the second pruning, one finds much the same growth to be treated as on the apple, but it will generally be forced out in greater profusion, and in the case of upright growers, in a more compact mass. The shortening-in process should be strictly carried out, cutting off from a half to two-thirds of the last season's growth. In the upright growers the shoots should be considerably thinned out, cutting out always the inner ones, to force the growth outwards, in order to spread the tree. *The course of treatment to be pursued in future years is a constant cutting back and thinning out of the long upright growth, and the keeping of the spurs, after fruiting, in a sound and healthy state by an occasional thinning-out and shortening-in.* The main object should be to keep the tree open, in order to allow the sun to ripen the spurs, and also to give them room to grow and carry their fruit. We may here state that we do not approve of a system practised in some orchards we have seen. In place of shortening-in the head the limbs are bent out, and brought into a horizontal position by being fastened to stakes. It is certainly a ready way of encouraging fruiting, but we have frequently noticed that trees so treated are liable in the near future to be severely scalded by the sun, resulting in an entire burning away of the exposed surface, ever afterwards making an unhealthy tree.

1900. The constant cutting back and thinning out of the top we still consider necessary, but it must be done in moderation. Don't cut back too severely, one-third of the last season's growth will be enough, and leave the laterals from 6 inches to 12 inches in height, dependent on their position.

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## THE PEACH.

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1896. The pruning of this tree we consider the most intricate of all, but it is very simple when the idea is once grasped. The fruit is carried on the new wood, *i.e.*, the wood of the previous season's growth. The one object then is to induce the growth of new or bearing wood, which is done by heavy cutting back and thinning out, as it must be remembered that however much growth

is forced out one can part with just as much as one considers desirable, leaving such shoots as will most evenly distribute the fruit over the entire bearing-surface of the tree.

In taking the tree after its second season's growth, one will probably find a fair number of double and treble buds on the shoots thrown out, which are the fruit-yielding buds, as the peach is a very precocious bearer, carrying a crop in its third year. The system to be pursued at this pruning and at every subsequent annual one is the same, a more or less severe cutting-back, and thinning-out, and a glance at each individual tree will show where the fruit for the coming season is being carried.

Should the tree be what is called well set to fruit, a greater amount of cutting clean away can be done. If the fruit is being carried near the base of the new growth, the shortening-in must be heavy, cutting away about three quarters. Should the tree make a poor show for fruit, more wood must be left; and if the fruit is carried near the ends of the new growth, very little shortening-in must be done, but a heavier course of thinning-out.

Taking an average tree, fairly set to fruit, the new growth retained must be shortened-in to one-half of its former length, and this wood must be spread over each individual branch, by cutting out usually the most upright and central growth. It must be remembered that this central and strongest growth, is as a rule, the most unsatisfactory for bearing. Examine your branches and you will often see that you can cut away this strong growth, and retain a couple of thinner and thoroughly ripened bearing shoots below, thus bringing the tree two feet or three feet lower at a cut, and at the same time retaining the best bearing wood. We may say that one can cut into the old wood of a peach tree with impunity, and we should frequently do it should we have desirable bearing wood below, in order to bring the tree down. What one has to remember in cutting is to spread the shoots one wishes to retain, by cutting out the centre. It is not advisable to cut clean away well-ripened wood thrown out from the main limbs, but shorten them in, and they will carry fruit of an excellent quality safely. At the same time there are very frequently thrown out a number of sappy unripened shoots in the centre of the tree where the sun has had no opportunity of playing; these should be in every instance cut clean away.

1900. We have no objection to the directions given above, but advise growers to modify the whole system by not cutting so heavily, our reason being that on getting knowledge covering a more lengthy period of years, we are satisfied that peaches in most varieties grown are a more or less uncertain crop; there is invariably a heavy drop of fruit resulting generally in a light crop; we prefer now to prune less heavily and to *thin thoroughly*; if too heavy a crop sets in this way, a regular crop of peaches can be almost relied upon. Also we wish to draw growers' attention to the absolute safety of doing one's cutting back, especially in peaches and Japanese plums, after the fruit has set; we have tried it several years and can recommend it with confidence.

## THE APRICOT.

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The Apricot is probably the tree of all others that suffers most from a neglect of annual pruning. It carries its fruit on the spurs thrown out from the wood of more than one year's growth, and also sometimes on the wood of the last season's growth. But being a rampant grower, it is inadvisable to take into consideration the possibility of obtaining a few fruits on the long tops of new wood, as to keep the tree well in hand, these must be sacrificed, and one can rest assured that the act of disposing of them tends to force out spurs from the older and stronger wood, which brings one's fruit in nearer the main supply of sap, which circulates more freely through these stronger branches, thus increasing size and quality of product, and also placing the fruit in a position where the wind will do it little damage.

In taking over the tree at the second winter pruning, one finds a strong and heavy growth of the new wood, frequently a yard in length, and occasionally six feet. The greater portion of this must be cut away. One will generally find that from the ends of the wood left at the former year's cutting two, and sometimes even three and four, strong shoots have been thrown out. Should there be but two, spread well apart and also spread out in such a way as not to interfere with any shoot on the next branch which it is advisable to retain; both can be kept, shortening into a quarter or a third of their length, the object being always to retain these limbs as nearly equi-distant as possible; if three or four shoots have been thrown out, one or two must be cut *clean* away, it always being kept in mind that the wood now being left will be the future main limbs and there must not be too many of them; and their general directions must be maintained, always avoiding the formation of angles and forks in the branches as much as possible. Actual fruit-bearing spurs will seldom be found in the Apricot at the second pruning, but there may be a number of small laterals or spurs which will eventually bear fruit. These must not be cut away, *but shortened-in to two inches, or three inches*, and if there is a profusion, must be thinned out. The third and following annual cuttings must be of similar character, the cutting away of the majority of the long tops, and a heavy shortening-in of those retained. It is not desirable to have too many limbs, as when the fruit spurs are thrown out, and all those over 2 inches to 3 inches in length are shortened-in, these spurs will not only carry fruit, but throw out other spurs from their terminal buds, and if these are intelligently treated they will continue healthy and vigorous and bear fruit for many successive years, and they must be allowed room. The points to be remembered are to shorten-in the fruit spurs

and to keep the top well headed down. It is very undesirable to cut into the old wood of an apricot tree, and it is never necessary if the annual pruning has been done. If one season you neglect this cutting away of the tops, and have to cut into the old wood the following year, the symmetry of the tree is destroyed for ever. Any professional man could detect it at a glance half a dozen years after the omission.

Another important point to remember is, to cut all the dead fruit spurs on the main stem, because after this is done the dormant buds on either side will be more inclined to throw out; and when they do they are sure to form fine fruit producers.

1900. We still consider our 1896 directions good throughout, but would say that instead of cutting back the fruit spurs to two or three inches we should shorten them from four inches to seven inches, dependent entirely on the length, and as a rough guide we would say shorten all those of over eight inches long to half their original length, those between four and eight inches long shorten to four inches, and those of a less length than four inches leave alone.

As regards the long tops, when the tree gets over five years of age we would say shorten them in one-third of their length.

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## THE PLUM (INCLUDING ALL PRUNES).

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1896. The Plum also bears on the short spurs, consisting of a mass of sharply pointed buds of half an inch and upwards, and also on the laterals of from six inches to two feet in length, in each case thrown out from the old wood. At the second winter pruning one will expect to find a long rampant perpendicular growth, two or three shoots being thrown out from the terminal buds of the wood allowed to remain at the last cutting. The object should always be to spread the tree. It is therefore advisable to retain the outward shoot, shortening it in to one-third its original length. Never retain the whole of the long perpendicular growth on each branch, but it is quite allowable to retain two such growths on one limb, should they be well spread apart, and if number two tends to fill a space in the general symmetry of the head. Should any laterals be thrown out they must not be cut away, but shortened-in to a third of their length. These laterals, which will later carry the majority of the crop, must be carefully tended to keep them in a healthy condition. The year after they are first thrown out, and the shortening-in just described has been done, they will form fruit-buds on the majority, their length, and also throw out short growths from their terminal buds, which should be shortened-in, and so treated in successive seasons. One's whole object in spreading the foundation of the tree is to give these

laterals the space to grow, and to allow them air and light, to ripen their buds, and mature their fruit. Shortening-in *all* the perpendicular growth, and cutting away none, is a most fatal course to pursue, infinitely rather do nothing at all, as every year a cutting is done brings the following season a duplex and triplex growth, resulting in a thickset growth of unripened, sappy wood, which could never carry fruit, except perhaps a little on the outside. It is absolutely necessary that the laterals get sun and light. Should this course of cutting-back and thinning-out be followed for four or five years, when the tree is in bearing, little or no pruning will be required, as the weight of the crop will always tend to spread the tree, giving the limbs more room. No! The plum requires little pruning when once in bearing, a shortening-in, or thinning-out of laterals, which may intersect, only.

1900. We have no comment to make on our recommendation of 1896 as to the pruning of the plum, we still think that if our directions are carried out a good tree will result. However there is one feature in plum growing in this country which needs some notice. We have given this a separate article, which you will find on page 56. This is the article referring to the uneven starting out of domestic plums.

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## SPRAYING.

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The spraying of fruit trees is necessary if growers are to make a success of their orchards. It is a remedy for both insect pests and fungoid diseases, but the ingredients and manner of applying vary considerably.

We shall only give here particulars of the several washes which we have found efficacious and also some particulars of how to make them and apply them. We, in getting satisfactory results, have generally followed the instructions and formulae issued from time to time by the United States Department of Agriculture, and we think we cannot do better than draw on the same well-informed source, for the particulars we are here supplying to growers, making a few alterations and eliminating details that we do not think are needed by growers in Africa.

### FUNGICIDES AND FUNGOID DISEASES.

*Bordeaux Mixture* we have found to be away ahead of all washes as a fungicide in the West.

Mainly because it is applied in the Spring without any danger to foliage and at a time when the rainy season is practically over, this latter being a very important consideration. We believe thoroughly in the winter washes, but we find them impracticable, owing to continuous rains, resulting in our inability to move an

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orchard spray pump on wheels through the orchards, the spray being continually washed off and serving little purpose.

The U.S. Department of Agriculture say as follows :

This wash (Bordeaux) has long been recognized as possessing the most valuable qualities, and it is probably more generally used to-day than all other fungicides combined. The chief points in its favour are, (1) its thorough effectiveness as a fungicide, (2) its cheapness, (3) its safety from a hygienic standpoint, (4) its harmlessness to the sprayed plant, and (5) its beneficial effects on plants other than those resulting from the mere prevention of the attacks of parasites.

All things considered, it is believed that the best results will be obtained from the use of what is known as the 50-gallon formula of this preparation. This contains—

Water ...	...	...	...	50 gallons
Copper sulphate...	...	...	...	6 pounds
Unslacked lime ...	...	...	...	4 pounds

It has been found that the method of combining the ingredients has an important bearing on both the chemical composition and physical structure of the mixture. For example, if the copper sulphate is dissolved in a small quantity of water and the lime milk diluted to a limited extent only, there results, when these materials are brought together, a thick mixture, having strikingly different characters from one made by pouring together weak solutions of lime and copper sulphate. It is true, furthermore, that if the copper sulphate solution and lime milk are poured together while the latter or both are warm, different effects are obtained than if both solutions are cool at the moment of mixing. Where the mixture has been properly made there is scarcely any settling after an hour, while the improperly made mixture may settle more than half.

Briefly, the best results have been obtained from the use of the Bordeaux mixture made in accordance with the following directions. In a barrel or other suitable vessel place 25 gallons of water. Weigh out 6 pounds of copper sulphate, then tie the same in a piece of coarse gunny sack and suspend it just beneath the surface of the water. By tying the bag to a stick laid across the top of the barrel no further attention will be required. In another vessel slack 4 pounds of lime, using care in order to obtain a smooth paste, free from grit and small lumps. To accomplish this it is best to place the lime in an ordinary water pail and add only a small quantity of water at first, say a quart, or a quart and a half. When the lime begins to crack and crumble and the water to disappear, add another quart or more, exercising care that the lime at no time gets too dry. Towards the last considerable water will be required, but if added carefully and slowly a perfectly smooth paste will be obtained, provided, of course, the lime is of good quality. When the lime is slacked add sufficient

water to the paste to bring the whole up to 25 gallons. When the copper sulphate is entirely dissolved and the lime is cool, pour the lime milk and copper sulphate solution slowly together, using two buckets, each handled by a man, into a barrel holding 50 gallons. The milk of lime should be thoroughly stirred before pouring. The method described insures good mixing, but to complete this work the barrel of liquid should receive a final stirring, for at least three minutes, with a broad wooden paddle.

It is now necessary to determine whether the mixture is perfect—that is, if it will be safe to apply it to tender foliage. To accomplish this, two simple tests may be used. First insert the blade of a penknife in the mixture, allowing it to remain there for at least one minute. If metallic copper forms on the blade, or in other words, if the polished surface of the steel assumes the colour of copper plate, the mixture is unsafe and more lime must be added. If, on the other hand, the blade of the knife remains unchanged, it is safe to conclude that the mixture is as perfect as it can be made. As an additional test, however, some of the mixture may be poured into an old plate or saucer, and while held between the eyes and the light the breath should be gently blown upon the liquid for at least half a minute. If the mixture is properly made, a thin pellicle, looking like oil on water, will begin to form on the surface of the liquid. If no pellicle forms, more milk of lime should be added.

#### STOCK SOLUTIONS.

The foregoing directions apply to cases where small quantities of the mixture are needed for more or less immediate use. If spraying is to be done upon a large scale, it will be found much more convenient and economical in every way to prepare what are known as stock solutions of both the copper and lime. To prepare a stock solution of copper sulphate procure a barrel holding 50 gallons. Weigh out 100 pounds of copper sulphate, and after tying it in a sack suspend so that it will hang as near the top of the barrel as possible. Fill the barrel with water, and in two or three days the copper will be dissolved. Now remove the sack and add enough water to bring the solution again up to the 50-gallon mark, previously made on the barrel. It will be understood, of course, that this second adding of water is merely to replace the space previously occupied by the sack and the crystals of copper sulphate. Each gallon of the solution thus made will contain two pounds of copper sulphate, and under all ordinary conditions of temperature, there will be no material recrystallization, so that the stock preparation may be kept indefinitely.

Stock lime may be prepared in much the same way as the copper sulphate solution. Procure a barrel holding 50 gallons, making a mark to indicate the 50-gallon point. Weigh out 100 pounds of fresh lime, place it in the barrel and slack it. When slacked, add sufficient water to bring the whole mass up to 50

gallons. Each gallon of this preparation contains, after thorough stirring, two pounds of lime.

When it is desired to make Bordeaux mixture of the 50-gallon formula it is only necessary to measure out 3 gallons of the stock copper solution, and after thorough stirring, 2 gallons of the stock lime; dilute each to 25 gallons, mix, stir and test as already described. One test will be sufficient in this case. In other words, it will not be necessary to test each lot of Bordeaux mixture made from the stock preparations, provided the first lot is perfect and no change is made in the quantities of the materials used. Special care should be taken to see that the lime milk is stirred thoroughly each time before applying. As a final precaution it will be well to keep both the stock copper sulphate and the stock lime tightly covered.

The Bordeaux Mixture can be applied safely at any time, and we think if one is able to get on the job the first application should be made before the blossoming period. As it must be remembered that fungicides are not a cure, but a *preventative* arresting the germination of the spores, therefore early application is necessary. The spraying can safely be continued through the blossoming period we find three or four sprayings sufficient to retain our foliage in a healthy condition and apply every two or three weeks from the date of the first application, a good deal of course depending on whether we get rains or not. Meanwhile we can assure growers that we had our own trees, particularly prunes and domestic plums, bare of foliage in the middle of March in 1898, whereas in 1899 they were in full foliage a month later—this result we put down entirely to the use of Bordeaux Mixture.

*Lime, Sulphur and Salt* is also a thoroughly effective fungicide, and we can recommend it with confidence in the East and North, where the Winter is almost always fine, and where when the work is well done it should remain on the tree during the winter. It must never be used except when the tree is *quite dormant*, or it will kill off the trees. Besides being a fungicide it is a sure cure for the white scale of the peach, a disease very prevalent throughout Africa; also efficacious against other scales, in fact it is the best cure for the white scale we know of and also for curl leaf in Peaches.

The following formula and directions, if properly carried out, will produce an effective solution :

Unslacked lime.....	4 1/2 pounds	Stock salt.....	15 pounds
Sulphur.....	20 pounds	Water to make 60 gallons.	

**DIRECTIONS.**—Place 10 pounds of lime and 20 pounds of sulphur in a boiler with 20 gals. of water, and boil over a brisk fire for not less than one hour and a half, or until the sulphur is thoroughly dissolved. When this takes place the mixture will be of an amber colour. Next place in a cask 30 pounds of unslacked lime, pouring over it enough hot water to thoroughly slack it, and while it is boiling add the 15 lbs. of salt. When this is

dissolved, add to the lime and sulphur in the boiler and cook for half an hour longer, when the necessary amount of water to make the 60 gallons should be added.

With the effective use of one or other of the above fungicides, or both if necessary, we are confident any orchard can be kept clean from fungoid diseases.

#### INSECT PESTS.

*Pear Slug*, is prevalent all over the country and affects pears, plums, and cherries. This of all the pests that trouble the orchardist is about the easiest to get rid of. We remember the time however, and that only a few years ago, when the growers in the Western Province used no remedy for this pest, and we have ourselves heard such an intelligent grower as Mr. C. D. Rudd, of Newlands, declare that it was of no use to plant a pear or a plum in Africa, as they were always defoliated by Xmas; perhaps even to-day in some parts of Africa growers do not know how to kill this ugly little pest, whose destruction is so simple.

*Remedy.*—Spray with Paris green at the rate of one lb. to anything from 150 to 230 gallons of water, and add *unslacked lime* in sufficient quantity to make the solution a whitish colour. When it dries on the trees, this addition of lime both prevents the Paris green from destroying the foliage and enables the orchardist to have a check on his sprayers, by allowing him to discover at once if any trees have been skipped, or if the spraying has been badly done. We recommend beginners to use the weaker solution of Paris green, and add say five lbs. of lime to one lb. Paris green. Many orchardists prefer to add treacle, which helps to fix the grains of the material on the foliage, as it must be remembered that they do not dissolve, but we consider the price of the treacle too high in this country to allow of its being generally used; this mixture must be *kept well stirred* when being used.

*Caterpillars.*—From American sources, we see several remedies recommended, Paris green being the favourite. We must say however that we have tried every known remedy and have got no result, so as far as we can see; that is to say that whereas we have suffered from time to time very terribly from caterpillars, we have always had to fall back on hand picking, which is an expensive job, but which on young trees especially it will repay the grower very well to do.

*Red Scale*, and indeed other scales, are of course sucking insects that draw their sustenance by pushing their proboscis through the bark, and sucking out the sap as it ascends or descends. Growers can readily understand that the Paris green, or other poison, has no effect, because the food cannot be got at, therefore suffocation is the only means of killing.

The most effective remedy is, of course, the Hydrocyanic gas treatment by means of fumigation with tents. The efficacy of

this has been thoroughly put before farmers, by our able entomologist, Mr. C. P. Lounsbury, and it would be out of place here for us to enlarge on it, but we must say it is the treatment that we ourselves use and believe thoroughly in. In regard to the sprays that suffocate the best of these we believe to be the

*Resin Wash.*—Formula 20 lbs. resin, 6 lbs. caustic soda, 3 lbs. fish oil, water to make 100 gallons.

Directions for preparing the above Wash.—Place the resin, caustic soda, and fish oil in a large boiler, pouring over them about 20 gals. of water and cook thoroughly over a brisk fire for at least three hours; then add hot water, a little occasionally, and stir well until you have not less than 50 gals. of hot solution. Place this in the spray tank and add cold water to make necessary amount. Never add cold water when cooking.

*American Blight* (woolly aphis).—We have no pest in this country, whose ravages are so widespread as this one, and probably none so difficult to keep in control (we say keep in control advisedly because we find it impossible in old orchards when the aphis is on the roots to entirely keep the pest away). Our remedy which we have used with great success is *paraffine emulsion*.

*Formula.*—Paraffine, 2 gallons; whale-oil soap (or 1 quart soft soap), 1 to 2 pounds; water, 1 gallon.

Dissolve the soap in water by boiling, and add boiling hot, away from the fire, to the kerosene. Agitate violently for five minutes by pumping the liquid back upon itself with a force pump and direct-discharge nozzle throwing a strong stream, preferably one-eighth inch in diameter. The mixture will have increased about one-third in bulk, and assumed the consistency of cream. Well made, the emulsion should keep indefinitely, and should be diluted only as wanted for use. This solution can be diluted from 10 to 20 times at discretion of the sprayer.

Should your trees be supplied you from the Nurseryman free from aphis—which is a consummation devoutly to be wished, your best method of keeping your orchard clean will be by having your eye continually round the trees, and should a spot be discovered where the insect has got a hold, treat it at once with neat paraffine and a feather, which kills immediately on contact; we do not advise the wholesale treatment of this fruit with neat paraffine, but we do insist that it requires radical treatment should it get lodgement in an orchard.

*Red Spider* is a serious pest in the spring on young grafts, and indeed some years on young growth generally; again, in the fall before and during the time the fruit is ripe, it is a serious pest in plum trees. Sulphur applied dry either by bellows or the shaking of coarse bags is an almost safe cure; there is also in this country a minute black spider with red legs, who is a great

pest, especially on old top-grafted trees ; these you will also find succumb readily to this treatment. Lime Sulphur and Salt applied in winter is also an excellent remedy.

*Peach Maggot.*—We know of no remedy, but can recommend strongly the picking up of the maggoty fruit as it drops, and consigning it to the pigsty, in fact we think it positively suicidal for a grower to allow maggoty fruit to lie on the ground. Mr. C. P. Lounsbury says if growers would only combine and do this effectively, it would greatly help in spite of the insect being in the wild fruit, and from our own personal experience we must agree with him, and recommend to all growers to *keep this up*.

*Codlin Moth.*—It is a very important matter for growers of apples and pears to keep this pest in check, it has been many years in the Colony and makes slow headway, and with proper care we may be able to keep it in check. The attention of all growers is here drawn to the notices of the Agricultural Department posted in most public places in the Colony, and drawing attention in a very concise form to the character and style of this pest ; we cannot but emphasise the benefit to the public of reporting any discovery in a new district of its presence (which is easily identified) to the Government Entomologist, Cape Town.

In conclusion, we would say that spraying will be only partially successful, no matter what the wash is, unless growers take care to see that the solution is *kept constantly and thoroughly stirred*.

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## LATE AND EARLY BLOOMERS.

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This subject is one of great importance to most growers in South Africa, almost all our letters of enquiry contain some reference to it. One cannot help noticing that in this connection almost all growers jump to the conclusion that because a tree bears late it must necessarily blossom late, whereas as a matter of fact one may almost state that the reverse is the case. The date of blossoming is affected by very many weather conditions in each year, and may even vary in almost any variety to the extent of one month, but, however, there are certain fruits whose habit it is under the same conditions to fruit earlier than others, and it is naturally safer to plant these sorts where late spring frosts occur.

The selection of a site for an orchard is a very important factor in its freedom from late and unseasonable frosts. This is a matter which can be only left in the hands of the individual grower. It is quite extraordinary on most farms in Africa, the variation in the temperature in stretches of land practically adjoining. Touching on the point that we raised when we said that the earliest fruits often blossom latest, we may bring up the fact that in parts of the Transvaal where severe frosts are encountered and

where trees blossom late. Let us take apricots, they blossom late, and the fruit is ripe and on the market from two weeks to one month ahead of ours in the Western Province.

In peaches again, we have Early Alexander Briggs Red May, and indeed all the other well-known earlies; they all blossom late.

In pears, amongst other well-known sorts the Bon Chretien blossoms late and ripens its fruit early.

In Japanese plums, Kelseys blossom very early and ripen the fruit very late. Simoni again blossom late and ripen their fruit early. We only mention a few striking instances offered as a caution to growers not to order late fruits to escape late frosts, but order the varieties that blossom late. This is again we consider a point that the Government should get information and publish it for the benefit of growers. We have not personally been able to collect the data as to the season of blossoming of all the varieties we stock. As a matter of fact, the majority of varieties blossom almost simultaneously, and again in the different classes of fruit we would say that, speaking generally, apples, pears and plums blossom later than apricots and peaches, almonds of course being earliest of all.

## IMPROPER STARTING INTO SPRING GROWTH OF DOMESTIC PLUMS AND OTHER FRUIT TREES.

It is known that throughout Africa the seasons are variable, especially the springs. Nothing has a more immediate effect on fruit trees than this. We are not here speaking of the fruit-getting possibilities of the tree, but the growth making only. This result is particularly noticeable some seasons in plums of the domestic type and in prunes, and also occasionally affects apricots, some sorts of peaches, mostly earlies, and a few sorts of pears.

The effect is that instead of the buds at the extremities of the perpendicular and lateral growths swelling first and then throwing out a young growth, the buds at the bases of the several growths start out first and often the result is that the base of the head is full of a growth of strong suckers and the rest of the head is dormant and remains so practically throughout the growing season. Now unless the question is tackled in an intelligent way the trees will be permanently injured. When the grower has made up his mind that some of his trees are going to play him the fool in this way, he must see at once that all this growth resulting from the forcing of these base buds is pulled away, and he must keep this up by pulling away the growth as it is thrown out. By this course of treatment the sap will be forced into its proper channels, which is of course the limbs of

the head which perhaps the grower may have taken several years to secure, and that as the result of a great deal of pains, trouble and expense.

We wish to draw growers, special attention to these instructions, as we think they will prove of considerable service when these conditions arise. Should this erratic style of spring growth continue for two or three consecutive years, the orchardist's only course is to work over the tree to another variety, whose habits are regular in his particular district. We have this year had several complaints about early peaches acting in this manner, this is the first season we have had a general complaint and we have known them over several years to do well. We consider cold winds to be the main factor towards the unhealthy effect.

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## WHY FRUIT DOES NOT SET.

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Often this happens on young trees because growers almost always expect a tree to carry a crop before it is sufficiently matured to do so; the fact of the matter being that there is no worse sign to the intelligent grower than to find his trees coming into bearing before the right age. In a young tree we consider that although sometimes it blossoms freely and one would naturally expect a crop, it does not set the fruit because the flow of sap is so strong that it tends to throw the fruit off in trees of bearing age for either of the following reasons:

1. Because during the blossoming season continued or frequent rains occur, thus washing out the pollen; in this matter it may be laid down as a fact that rain in the blossoming season *must* mean a shortage in the amount of fruit that sets.
2. Because the fruit before setting is cut off by a frost or cold wind.
3. Because insects may be prevented from visiting the flowers during blossoming season; it is essential that they should do so, and the keeping of bees is quite to be encouraged by growers for this purpose.
4. Because the varieties planted need cross fertilization. Several varieties of apples and pears and plums are in themselves unfertile, indeed of other classes of fruit in a lesser degree and to secure a crop must be fertilized with pollen from another sort, therefore it is always advisable not to plant varieties in great big blocks of one sort. In all our own plantings we have invariably kept this matter in view, generally alternating rows with different varieties. Some growers prefer to alternate the single trees, but we think the different rows planted to different sorts should meet the difficulty.

In the matter of the fertilization by bees it has been proved that they should be kept within half a mile of the orchard. As although they do often work under a radius of two or even three miles, it is not so certain that their work is so effective.

We would say as a guide to planters that :

*Pears* may be expected to come into bearing the 5th or 6th year, dependent on the variety.

*Apples* may be expected to come into bearing the 3rd to 6th year, dependent on the variety.

*Peaches* may be expected to come into bearing the 3rd year, dependent on the variety.

*Apricots* may be expected to come into bearing the 4th year, dependent on the variety.

*Plums, Domestic*, may be expected to come into bearing the 5th year, dependent on the variety.

*Plums, Japanese*, may be expected to come into bearing the 3rd year, dependent on the variety.

In each class there is some variation between the several varieties.

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## DIE BACK CAUSED BY SOUR SAP.

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This is a disease which we have noticed to be prevalent all over the Colony, growers from time to time in different places calling our attention to the same and asking its cause and cure. The remarks below, by Leonard Coates of California, can be literally applied by us, the disease showing itself in the same manner, and ending in the same result. We have occasionally seen very serious loss from this cause in this country, our springs here being very uncertain, naturally giving such result.

“Early spring orchardists should not forget to examine their cherry, prune, and plum trees for signs of “gumming” and other diseases in the bark. Cherry trees will generally give evidence of the ailment by the exuding of gum, although it frequently happens that a fermentation of sap has been going on for some time, thus decaying the cambium layer for a space of, it may be, a foot or more before the evil is discovered. Sometimes a branch is nearly if not quite circled, and unless the trees are carefully watched they will suddenly die, because the bark is all dead at some point, sufficient to prevent the flow of sap. It is only the practised eye that can readily detect this disease unless the gum shows on the outside. Let the trees, then, be closely watched at this time, and for the next month or two, and an occasional incision may be made with a knife to ascertain the state of the bark. All gumming or discoloured spots should be cut out clean,

and the exposed wood, when dry, waxed over or shaded. Such places should be covered with wax, but to do everything when it should be done, and how it should be done in an orchard is not always possible; cut out the gum at all events, as that if done in time will save the tree.

With the plum and prune this disease develops somewhat different symptoms, and is more difficult to control because less apparent to the inexperienced grower, and many grown gray in the service wonder why their trees die. A dark, "dead" appearance of the bark, often forming a slight depression, and if the tree be moderately vigorous a cracking of the bark, and also exudation of gum, are all symptoms, which, either one or all, require prompt treatment. This treatment is simply to cut out all dead or diseased bark, which should be done cleanly and neatly, and wax or paint the exposed wood.

If the tree is too far gone to be saved, it may be sawn off at or below the ground, and grafted. Scions should be kept dormant for such an emergency, so that it could be done as late as September. This disease is not of the root, which invariably remains healthy until after the whole top is dead, and may continue still to live, by throwing up suckers.

This very prevalent disease is often called "sour-sap," which means even less than "malaria" in the human family, being capable of so wide an interpretation. It is not caused by wet land, and has nothing to do with the root, but it is most probably due to a sudden chilling or freezing of the sap on the most exposed side in the spring, after a period of warm weather has started growth. This causes a rupture of cells, decay of tissue, fermentation of sap, and death. To prevent such a catastrophe, keep the trees protected while young, from the time they are planted by wrapping with burlap, or watch them every spring from the first, and cut out any decayed or discoloured spot while small. It is commonly supposed that trees thus affected die very suddenly. They appear to do so, it is true, one day being in bloom, or in leaf, and in forty-eight hours, or less, dead. In reality such death is lingering, the condition above described causing a gradual decay which does not terminate fatally until it has spread all round the tree.

With the cherry the disease acts more rapidly than with the prune or plum, and while in this case it may be a specific complaint due to other causes, I am firmly convinced it is largely due to climatic influences."

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## IMPORTANCE OF PLANTING TREES AND NOT WAITING FOR RAIN.

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We consider the above heading of sufficient importance to orchardists throughout the country to warrant a separate paragraph. Under our remarks on the "Initial Difficulties of Establishing Orchards in South Africa" we give directions as to the importance of planting young trees during the natural dormant period, and we give full directions for so doing (see page 33. We again commend these instructions to your notice which we feel sure if carried out will give you a successful orchard with practically the loss of no trees. As an additional safeguard under the condition of drought, after planting we would say shelter the stem with reeds or grass or the branch of a tree or something, also some grass spread on the ground round the tree will tend to additionally retain the moisture. As planters we prefer every time to plant our tree in a drought to letting it lie in cold storage although we have had splendid results in the latter manner.

The planting, however, in the proper dormant season is nearer following nature.

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## THE CALIFORNIA PRUNE.

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[PETIT D'AGEN.]

This variety has been by far the most important introduction to this country during recent years in commercial varieties of fruit, and a short description of it shabits and utility will not be out of place, and should prove of interest to those who intend planting orchards for profit.

Introduced into the Santa Clara Valley of California from France in 1856, it was not until about 1870 that this variety began to claim public attention. It was in this year that the well-known Bradley orchard (still in full bearing) was set out. In a few years this commercial prune orchard yielded such enormous profits, that it immediately led to extensive planting, not only in the Santa Clara Valley, but over the whole of the State of California, and extended even right north through the States of Oregon and Washington, and east and south-east through Utah, Idaho, Arizona and Texas.

In a few years five million trees of this single variety were planted in the State of California alone, and still planting went

on. The demand continued through each year of my stay in that State, invariably exceeding the supply.

The rush into planting this variety is easily accounted for by anyone who has been closely connected with prune growing and handling. It is a healthy and strong grower, adapts itself on the several roots it favours to practically all characters of soil; with proper attention will flourish without irrigation even on dry soils; we having ourselves seen fine prune orchards in districts where there was only 22 inches of annual rainfall, and wells had to be sunk 150 ft. to strike water.

Again, the trees naturally take a good shape, the "low head system," explained page 17, being the system generally favoured. After the trees have come into bearing at 6 years of age, little annual pruning is required. Previously to that our system explained under the heading of "The Plum" is an excellent one. The harvesting is a simpler operation than with any other fruit we know, the plums not being picked by hand, but simply shaken off, all those fruits not falling to the ground after a fairly vigorous shaking are left for the next going over, as they are not sufficiently ripe.

After being placed in boxes the plums are taken to the drying ground, where they are immersed in a solution of lye, afterward rinsed off in fresh water, then emptied into the drying trays: then in California they are placed in the sun, and usually take 5 or 6 days to be thoroughly dried, when they are removed to the sweating house, preparatory to being handed over to the packers to be processed in the several ways they favour, prior to being placed on the market.

During our itinerary in California we have seen prune orchards growing, and bearing well in every possible variety of soil and under very many different climatic conditions, and we have never known a single entire failure of crop. In the Delta lands of Tulare County, we have seen nine-year-old trees carrying over 1,000 lbs. weight of fresh prunes, and whole orchards of several thousand trees averaging 500 to the tree.

This, however, is quite exceptional. One may put down 100 lbs. to 200 lbs. of fresh fruit per tree as an average crop in California.

One of the most valuable characteristics of this variety is its exceptional exemption from being blown off by winds. We have in Africa made several most thorough tests, and it holds its fruits against the strongest Cape South-easter in a way which has surprised all observers: the fruit is carried close along the main limbs and laterals, thus rendering it almost wind proof.

Single orchards containing several thousands of prune trees are now standing in different parts of South Africa, and their behaviour up to date, in some instances covering 4 and even 5 years, is satisfactory.

## JAPANESE PLUMS.

[PRUNUS TRIFLORA.]

This important family of Plums, which has been disseminated all over the world the last few years, and has made a reputation wherever introduced, deserves more than a mere nurseryman's classification.

First apparently brought to the notice of the fruit-growing world by an introduction to California in 1870 of a single variety, which shortly passed into the lands of Mr. Kelsey, after whom it was named by Messrs. Hammond & Co., who secured control of its propagation.

The merits of this variety were at once recognised, and large planting took place as soon as trees were procurable. This led to the introduction of other varieties, many through the medium of Mr. Burbank, the well-known horticulturist, Santa Rosa, and others.

These varieties have been disseminated mostly throughout the States, and later through Australasia and Europe, making their mark in each country.

The chief characteristics of this family are great productiveness, unusual precocity in bearing, being in this respect distinct from the *Domestica*, which latter carries its fruit on the two-year-old wood, whereas *Triflora*, like the Peach, bears on the one-year wood, and usually in the second year. The tree will then appear one mass of blossom. It is so in several parts of the Colony, and will carry more fruit than it ought.

Again, they are particularly exempt from disease, although Kelsey is somewhat troubled with shot hole fungus, and should be sprayed with Bordeaux Mixture. They are also as a whole remarkably long keepers, many varieties, such as Kelsey and Burbank, can be picked green and will ripen and colour up well *en route*.

Planters must not think that we are recommending the Japanese type to the exclusion of other well-known and popular sorts, but there are many districts of the Colony and Natal where the ordinary *Domestica* varieties will not bear or even grow.

All along the coast-lying districts from Port Elizabeth to Durban we are informed ordinary plums will not thrive. From what we have personally seen, we think this Japanese class of plums will supply the gap, as we have been particularly struck with their abnormal fruitfulness in some of these districts, and in two-year-old trees at that.

It has also been brought forcibly home to us that they need a somewhat sheltered locality, as, the growth being more or less willowy and the foliage somewhat delicate, the trees are liable to injury from the high winds.

In pruning, the trees of this variety must be cut down, as directed for others, *i.e.*, to 15 or 18 inches, after planting, and in successive years long tops must be considerably shortened-in, or the trees will soon become broken to pieces from the weight of fruit.

In varieties we have no hesitation in placing Kelsey, Burbank and Botan (Abundance) in the front rank.

On studying market reports from different parts of the world, we find these varieties side by side with *Domestica* fetching very high prices, and this last season have been shipped from California to England, bringing top prices. It is for reasons such as these that we commend them to the careful consideration of planters.

We may say the trees planted by us in 1897 on our own farm will bring us in 10s. per tree this season and we have over 1,000 of this age.

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## DESCRIPTIVE LIST OF FRUIT TREES.

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### APPLES.

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- Ben Davis.**—A popular and widely-distributed apple in America, especially through South and South-west. Tree hardy, free grower, abundant bearer, and late bloomer; fruit often of not the best quality, but excellent keeper; medium to large, skin yellowish, splashed red; flesh white, tender, moderately juicy, June to August.
- Blenheim Orange Pippin.**—An old and well-known apple of English origin, suited for cooking and dessert. Large, yellowish, becoming deep orange, stained and streaked with red on the sunny side. Good shipper. April and later. Late Bloomer.
- Cellini.**—An early cooking apple of English origin. Medium to large size, deep yellow, streaked or mottled red; flesh white, juicy, tender, fresh and pleasant. Free grower and excellent bearer. March.
- Cox Orange Pippin**—An English dessert apple of the first quality, size medium, yellowish, shaded and streaked with red, entirely the latter colour on the side exposed to the sun. A free bearer. March and later.
- Duchess of Oldenburg.**—Fruit large, round, skin smooth, greenish yellow on the shaded side, streaked with fine bright red side next sun; covered all over with russety dots. Flesh yellowish white; firm, crisp and very juicy; pleasant, brisk and refreshing flavour. Excellent early culinary or dessert apple of first quality. Ripens early summer, and continues in use a month or more. Free dwarfish, but hardy, and an excellent bearer. Early bloomer.
- Early Harvest.**—One of the few American apples highly approved of in England. Medium to large, pale yellow. Tree moderate grower, free early bearer. Flesh white, tender, juicy, crisp. An early dessert apple of great excellence. January and February.
- Emperor Alexander.**—A cooking apple, showy, and of the largest size. Skin greenish yellow streaked with red on the shady, and orange streaked with red on the sunny side. Flesh white, juicy, tender and slightly aromatic. Strong and vigorous grower and good bearer. March to May.

**French Crab.**—An English culinary apple, also suited for dessert: highly esteemed in Australia; principally noteworthy for its excellent keeping qualities. Has been known to keep 2 years under favourable conditions. Tree hardy, free grower and excellent bearer. Fruit medium to large, roundish. Skin dark green, strewed with russety spots, and reddish on the side exposed to the sun. Flesh greenish, juicy, sharp sub-acid. April and later.

**Gravenstein.**—A German apple, in very good repute all over the world. Tree very vigorous and productive, and an early bearer. Fruit large, greenish yellow, at first becoming bright-yellow, and beautifully streaked and pencilled with red and orange. Flesh tender and crisp, somewhat aromatic. Valuable for market and cooking. Succeeding admirably wherever grown. One of the best autumnal fruits. February—March.

**Jonathan.**—A beautiful American dessert apple, suited to most soils, shoots slender, but a vigorous upright grower, and very productive. Fruit of medium size, skin yellow, with lively red stripes, deepening to brilliant red next the sun. Flesh white, sometimes pinkish, tender and juicy, with a mild vinous flavour. April—July.

**King of Pippins.**—A well-known early English dessert apple, highly approved of in Australia, though not generally successfully grown in the United States. Skin greenish yellow, mottled red and slightly russety. Flesh yellowish, firm, juicy, rich vinous flavour. An excellent shipper. February and March.

**King of Tompkins County.**—Large, handsome American apple, popular in the export trade, increased planting being recommended in Australia. Large, striped yellow and red, tree vigorous and productive. Flesh yellowish, rather coarse, juicy, with a decided aromatic, vinous flavour. April to August.

**Lady.**—A most exquisite little dessert fruit, whose pretty size and beautiful colour make it an universal favourite; is a great bearer and most profitable to the orchardist. Should be shipped in fancy packages like the Tangerine. Fruit quite small, with a brilliant red cheek on a yellow ground. Flesh white, crisp, tender, juicy, with a pleasant flavour. Bears its fruit in bunches, which may be allowed to hang quite late. Of the greatest antiquity, supposed to have been brought to Rome by Appius Claudius.

**Lord Wolseley.**—A New Zealand apple of the greatest excellence, suited for either dessert or cooking. Of

medium size, a moderate grower, and good cropper. Behaves here most excellently wherever tried ; foliage thick and dense. April and later. Late bloomer.

**Monmouth Pippin, or Red Cheek Pippin.**—Of American origin, size large, pale yellow, blushed red with russety spots. Free grower, and productive ; good shipper and late keeper. Flesh juicy, fine, brisk sub-acid, aromatic. May—August. Late bloomer.

**Nickajack.**—Fruit large, roundish, colour yellowish, striped and splashed with two shades red. Flesh yellowish, compact, moderately tender and juicy. A well-known American variety, ripening late and keeping well. The value of this variety is chiefly on account of its extreme hardness and productiveness. April—September.

**Nonpareil Russet.**—Fruit small, irregularly formed, skin green covered with large splashes of russet, streaked with silver scales. Flesh greenish, crisp, juicy with a pleasant aroma. An excellent dessert apple of the first quality. April—September.

**Northern Spy.**—A very popular American dessert apple of the best quality. Tree a vigorous grower, and does not come early into bearing. Fruit large, greenish yellow, with a yellow red cheek next the sun. Flesh white, tender, juicy, brisk sub-acid, a four months keeper. Blight proof. May—September. Late bloomer.

**Ohenimuri.**—A New Zealand dessert apple of great excellence, fetching the highest price in Covent Garden. A moderate grower, and early bearer. Flattened, skin bright yellow, slightly clouded brown ; an excellent keeper. Maintains its reputation here. April—September.

**Peasgood Nonsuch.**—Fruit large, roundish, somewhat oblate and very handsome. Skin yellow, overspread on sunny side with red, streaked crimson. Flesh yellowish, tender, very juicy, agreeable acid flavour. Fine culinary or dessert apple. Autumn ; average keeping.

**Prince Bismarck.**—Fruit large and handsome ; skin yellow, sprinkled all over with broken streaks of red, especially on the sunny side. This is a New Zealand variety. Flesh white, tender, juicy, slightly acid. April—July.

**Red Astrachan.**—Of Russian origin, the standard early apple in California. Vigorous grower ; free bearer. Has been shipped successfully to England from the Cape, but we only recommend it for Colonial markets. Of good size,

almost entirely red, a little yellowish on the shady side. Highly esteemed in its season. Must not be allowed to hang after ripening. Sells on its appearance. January to February. Early bloomer.

**Reinette du Canada.**—A large and handsome culinary and dessert apple. Skin greenish yellow, brownish on sunny side, covered with numerous brown russety dots. Highly esteemed in Australia. Well adapted to dwarf culture. May—August.

**Rhode Island Greening.**—A large and widely-popular American dessert apple. Tree strong, vigorous, spreading grower; very productive. Fruit large, roundish, dark green, becoming yellow when ripe. Flesh yellow, fine grained, and containing a lot of rich aromatic juice. May—July.

**Ribston Pippin.**—Needs no recommendation, well-known the world over; favourite Tasmanian variety, and good for the export trade. Needs a dry and well-drained soil. April till September.

**Rome Beauty**—An American early-winter dessert apple of great excellence, held in high esteem throughout the United States, and also in Australia, where it is particularly favoured by exporters. A moderate grower and late bloomer. Fruit large roundish, yellow, shaded and striped with bright red, and sprinkled with light dots. Flesh yellow, tender, juicy, and sub-acid. April—June, bears very young. Late bloomer.

**Scarlet Nonpareil.**—An excellent English dessert apple favourably known in Australia. Tree hardy, good grower, but slender; bears well. Fruit medium, round, regularly formed. Skin yellow streaked, red on the sunny side. Flesh yellowish white, firm, juicy, sweet. May—July.

**Stone Pippin.**—An English apple, highly esteemed by Australian growers. Tree vigorous, hardy, foliage dense: an abundant bearer. Fruit medium, oblong, green, becoming yellow. Flesh very firm, almost sweet. April to September.

**Sturmer Pippin.**—A dessert apple well-known in the Australian export trade. Of English origin. Yellow with bronze crimson cheek; of medium size; excellent bearer. May—August.

**Syke House Russet.**—Fruit small and almost round; skin yellow, entirely covered with brown russet. Flesh

yellow, firm, crisp, juicy, rich and sugary. Very excellent dessert apple that maintains its reputation here. May—October.

**Versfeld's (Warner's King).**—A popular late apple in the district of Constantia, always fetching good prices in the market. Grown by Mr. Versfeld, of "Classenbosch." A free grower and early bearer, and enjoys practically immunity from Aphis Blight. Fruit large, greenish yellow, freely streaked with red, almost entirely red on the sunny side. May—September. (Fruit has been incorrectly named "Warner's King" when sent to England for identification.)

**Warner's King.**—A large English culinary apple of the best quality. Tree hardy, free, and vigorous grower, and good bearer. Skin grass green, changing to yellow when near ripening, with dots and patches of russet. April to July. Late bloomer.

**White Winter Pearmain.**—Probably of American origin; highly esteemed in the Western States. Tree strong and healthy grower, and regular bearer. Fruit medium to large. Skin pale yellow, with a warm cheek, sprinkled with minute russet dots. Flesh yellowish, crisp, juicy, pleasant sub-acid. June—August.

**Wine Sap.**—A popular apple in Western America. Fruit medium to large. Skin dark red, yellow ground appearing on the shady side. An irregular grower, but abundant bearer. Not particularly recommended for table use, but a very fine cider fruit. Hangs long on tree. May to August.

**Worcester Pearmain.**—A handsome early English kitchen and dessert apple, of fine appearance. A free bearer. Skin yellow, almost completely covered with red. Flesh tender, crisp, juicy, sweet, with a pleasant flavour. February to March.

**Yellow Bellflower.**—A large, handsome and excellent table apple of American origin. Tree moderate grower and regular bearer. Fruit large, oblong, tapering towards the eye. Skin smooth, pale lemon yellow. Flesh tender and crisp before ripe, considerably acid. May to July.

**Yellow Newton Pippin.**—One of the most valuable of American apples, largely figuring in the export trade from that country. Large roundish, more or less flattened, with brownish-red cheek. Flesh firm, rich, juicy, with very rich, high flavour. Hardy and an

excellent bearer. Quite distinct from, and better than, the Green Newtown Pippin. A good keeper; does not maintain its high reputation here. June to September.

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## PEARS.

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**Bergamotte Crassane.**—Fruit medium size, roundish, flattened. Skin greenish yellow, marked all over with grey russet. Flesh white, buttery, melting, with a fine perfume. Is a good bearer. Must be pruned long.

**Buerre Bosc.**—Large, true pyriform, of good quality. Skin yellow, largely splashed with russet. Flesh white, fine, melting, buttery. A free grower and prolific bearer; a dessert pear of good quality that does well in this country. March and later.

**Buerre Clairgeau.**—A handsome, showy pear of the largest size. Skin fine lemon colour, tinged red on the sunny side. Flesh white, juicy, sweet, slightly coarse. A free grower and very productive. Is not much favoured in Covent Garden. March and later.

**Beurre Capianmont.**—Fruit medium size, obtuse pyriform. Skin pale yellow, almost covered with cinnamon coloured dots. A dessert pear of good quality; tree hardy, vigorous, and a very abundant bearer; one of the favourite pears throughout Australasia. Bears abundantly, and young. Latest.

**Buerre Diel, or Magnifique.**—A large and handsome dessert pear, of Belgian origin. Skin yellow, deepening marble, with russety dots. Flesh yellowish white, sweet and delicious. Tree a particularly free grower. This pear is grown in several districts of Cape Colony as Buerre Magnifique, and is highly esteemed. Good shipper. March and later.

**Buerre Hardy.**—Fruit large, handsome, strikingly even in contour. Skin shiny yellow, covered with russety spots. Flesh white, sweet, melting, and perfumed. It is worthy of note that this pear is very acceptable in Covent Garden, fetching the highest price of any variety shipped from California last year. One of the very best. March and later.

**Beurre Superfin.**—Fruit above medium height, three inches wide and a little more high, obovate, somewhat uneven on the surface. Skin greenish yellow, considerably

covered with patches of russet, stalk over an inch long. Flesh yellowish white, fine grained, buttery, and melting. A very fine pear indeed. March and later.

**Bon Chretien.**—(Williams.) The Bartlett of United States. A prime favourite all the world over, unsurpassed in its season as a market fruit, and has no competitor for canning purposes. Has been most successfully shipped to London from the Cape. It is worthy of note that 30,000 cases of this one variety are sold in Covent Garden daily during its French season. A free bearer, and upright grower. Ripens up well after picking, and will be mealy and unpalatable if allowed to ripen on the tree. Fruit large, pyriform, pale green, changing to yellow when ripe, and reddish on sunny side. Flesh white, fine-grained, buttery, melting, delicious flavour, and powerful musky aroma. Bears young. February.

**Clapp's Favourite.**—A large early pear, resembling Williams' Bon Chrétien, but ripens about one week earlier than the latter. Skin pale yellow, with brown dots. Flesh melting, buttery, juicy, with sweet vinous flavour. Tree very hardy and productive, and likely to succeed where others fail.

**December.**—The well-known Cape Christmas Pear. Tree a vigorous and upright grower, an excellent and regular bearer. Fruit small and of good flavour. The earliest known pear, ripe during December.

**Doyenne du Comice.**—Large, varying, roundish, pyriform. Skin yellow, covered with specks and patches of brown russet, particularly round the stalk. Flesh very tender, buttery, melting, juicy, and rich. A most delicious dessert pear. Tree a healthy grower and free bearer. Stalk  $\frac{1}{2}$  inch to 1 inch long. Good for shipping. March and later.

**Duchesse D'Angoulême.**—Fruit large to very large, roundish, obdurate, very uneven in outline. Skin pale yellow, covered with veins of pale brown russet; sometimes takes a brownish tint. Stalk an inch long, and stout. Flesh white, buttery, melting, delicious. A dessert pear of great excellence, and an excellent shipper. Tree of slender growth, one of the best on quince. April.

**Easter Buerre.**—A standard late variety, all over the world, of large size and excellent quality. Fruit roundish, flat, sometimes almost square. Skin yellowish green, freely sprinkled with russety dots. Flesh white, firm, grained, very buttery, melting, delicious. Tree a moderate grower, free bearer. Very good for export. Will keep several months. May and later.

**Fertility.**—A most prolific variety, raised by Mr. Rivers; of medium size. Flesh half melting, juicy and sweet, with perfumed flavour. Stalk  $\frac{3}{4}$  inch to an inch, stout. A most profitable orchard variety, and tremendous grower. One of the most successful in New Zealand. Maintains its reputation here. Bears young. March and later.

**Forelle, or Trout Pear.**—The most beautiful of all pears, of secondary quality only in Europe, but in California it improves in quality, and takes brilliant colour, which makes it unsurpassed as a showy table fruit. Ships well. Has been sent from California to England by myself, and eaten end of February, though picked in October. Must become popular in Covent Garden. Fruit medium size, oblong, obdurate. Skin yellow, brilliant red on sunny side, covered with reddish dots resembling trout. Flesh white, delicate, melting, sugary and vinous flavour. Hardy and vigorous grower. May—July.

**Gansel's Bergamotte.**—Fruit medium-sized, roundish, inclined to obovate. Skin greenish yellow on shaded side and reddish-brown next sun, the whole strewn with russety dots and specks. Flesh white, buttery, melting, but gritty; very juicy, rich, sugary and aromatic, and strong musky flavour. A dessert pear of highest merit; mid-autumn. Shy bearer; needs fertilizing from adjacent sorts.

**Glout Morgeau.**—A well-known and popular late shipping pear. Fruit above medium size. Skin pale greenish yellow, covered with greenish grey dots. Flesh white, tender, sugary and buttery; a very good dessert pear, well-known in the California shipping trade, and maintains its reputation here. May—July.

**Idaho.**—A new pear hailing from Oregon, which is being extensively planted. Of the largest size. Colour greenish yellow, with russety spots; form roundish; of good flavour, rich, sprightly, vinous. Core very small and without seeds. Should be popular. April and later.

**Jargonelle Pear.**—Fruit medium and pyriform; skin smooth and greenish-yellow, tinged dark brownish red next sun. Flesh yellowish white, tender, melting and juicy; rich vinous flavour and slight musky aroma. Tree healthy and vigorous. A well-known early dessert pear; ripens shortly after December pear, and should be picked when green and ripen off the tree.

**Josephine de Malines.**—A late dessert pear of first rate quality and of good size. Skin yellowish green, reddish on

sunny side. Flesh yellow, with a tinge of red, melting, sugary, juicy, with a fine aroma; straggling in its growth, hardy and a good bearer. June—September.

**Keiffer Hybrid.**—A very hardy American pear, most extensively grown, particularly through the Southern States, where thousands of acres of the variety alone are planted out. A vigorous grower, and free from blight. Fruit of large size, rich colour and good quality; excellent for canning. Should be house-ripened. April and later.

**Le Conte.**—Large, pyriform. Skin yellow. Of medium quality only, but tree remarkably vigorous, healthy and prolific. Very early; should be much before Bon Chrétien.

**Louise Bonne de Jersey.**—A very excellent pear, free grower and abundant bearer, carrying the fruit in clusters. Fruit medium large, pyriform; skin yellow on the shady side, reddish next the sun. Flesh white, juicy and melting, with perfumed flavour. Good shipper. March.

**Magnate.**—Fruit large, even and symmetrical in outline. Skin covered with dark-brown russet, which is strewn with large russet freckles. Flesh yellow, tender, melting, rather gritty at core; richly flavoured, somewhat of a rose-water perfume. Strong and free grower. Autumn.

**Pitmaston Duchesse.**—Fruit very large and handsome, pyramidal. Skin smooth and fine pale lemon colour, covered with patches delicate cinnamon-coloured russet. Flesh very tender and melting; juicy, exceedingly rich, sprightly, vinous flavour and delicate perfume. A handsome pear, finest quality. Autumn.

**President Albrecht.**—This fine pear (name unknown), rechristened by me, by kind permission of Mr. Albrecht (Late President Constantia Fruit Growers' Association), on whose farm the original tree stands, I have considered quite worth dissemination on its merits. Mr. Albrecht says of it: Is an enormous bearer, sometimes 5 to 7 fruits in a cluster, and branches have to be propped every year to prevent breaking of the tree; regular cropper. Fruit large to very large, a true pyriform; skin green changing to yellow; a delicate brownish red on the sun side. Fine, grand, buttery, melting, delicious; should be picked middle March and stored, when it ripens up gradually, developing best flavour. Tree healthy, vigorous, naturally taking good shape. March.

**Souvenir du Congress.**—A large red handsome early pear, resembling Bon Chrétien. Skin freely covered with cinnamon coloured russet, showing patches of the yellow

ground, streaks of crimson, and a warm glow of russet on the sunny side. Stalk an inch or more long, and very stout. Flesh yellowish white, tender, juicy, melting. An excellent pear, highly esteemed in Europe and America. February.

**Souvenir De Tongres (or Durondeau).**—Fruit medium-sized to large, handsome and regularly formed; small at stalk end. Skin, when fully ripe, yellow, inclined to crimson a little on one side. Flesh tender, sweet, juicy and melting; slightly wanting in flavour, but tree is particularly strong and healthy grower and heavy bearer. Ripens early mid-season; will keep two or three weeks if picked before ripe.

**Vicar of Winkfield.**—Fruit very large; pyriform, skin smooth, greenish yellow with a faint tinge of red on the side next to the sun. Flesh white, fine grained, half melting, juicy sweet. A large pear suitable for stewing; does well in Australia.

**White Doyenne.**—An old French variety, highly esteemed throughout the United States. Have been advised will ship to England without refrigeration. Size medium, obdurate; skin, smooth, pale yellow, sprinkled with small dots, often a red cheek. Flesh white, fine grained, buttery, melting and delicious. Good for export. April and later.

**Winter Nellis**—A well-known standard late variety. Tree characterised by a particularly slender growth. Fruit medium size, rounded; skin yellowish, covered with very numerous russety spots, and patches of brown russet. Stalk from 1 in. to 1½ in. long, curved. Flesh yellowish, finely grained, buttery, vinous, with a fine aroma. A splendid late variety which suits the frostless districts of the Colony admirably, the fruit attaining a size not dreamt of in Europe. Splendid for shipping, and popular in London. April—August.

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## PEACHES.

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### FREESTONES.

**Brigg's Red May.**—A Californian Early of especial merit, sent to me by Government Pomologist of New Zealand, who said that it should ripen here in time to ship Home for Christmas Market. Size medium to large, white skin with red cheek. Flesh greenish white, melting, juicy, firm, and delicious. Good shipper. Stone partially free, a standard Early.

**Crimson Galande.**—Fruit large, roundish. Skin almost entirely covered with very dark crimson, nearly black. Flesh very tender and melting, very much stained with red at the stone, from which it separates freely. A very excellent peach. Tree a free grower. Mid-season

**Dr. Hogg.**—A delicious and well-known English peach, of great merit. Medium to large size; skin thin but tough; yellow, dotted with crimson, and red cheek. Flesh yellowish white, melting, rich and delicious, red at the stone, from which it parts freely. A good shipper. Maintains its reputation here. Mid-season.

**Early Alexander.**—Fruit greenish white, nearly covered with red. Flesh firm, juicy; partially free stone. Ships well, maintains its reputation here. A standard Early.

**Early Rivers.**—An early English peach, highly esteemed in Australia, and maintains its reputation here. Fruit large, roundish, skin pale yellow, blush on the sunny side. Flesh pale to the stone, tender, juicy, rich. Too tender for shipment.

**Early Crawford.**—A peach of New Jersey origin, planted more than any other variety in California. Very large. Skin yellow, with red cheek. Flesh yellow, rich and excellent. A perfect freestone. Healthy and productive, well adapted for shipping and for canning; needs no recommendation, yellow Crawford peaches being kept in stock by the best grocers in every country. Splendid for drying. Mid-season.

**Elberta.**—Fruit large, yellow with red cheek; free stone. Flesh yellowish, highly flavoured and juicy. A mid-season variety, free growing and healthy; of very great repute in America. It is stated of this variety that Mr. J. H. Hale, the noted authority on the peach, has planted 60,000 trees. Has done well here when tested; one of our best.

**Foster.**—An Eastern American peach, widely grown and much esteemed in California. Very large. Colour deep orange red on sunny side. Flesh yellow, very rich and juicy. Ripens a week before Early Crawford. Very good for drying, and a good shipper. Mid-season.

**Gladstone.**—Fruit very large, roundish and depressed at crown. Skin pale; mottled red cheek. Flesh white, very tender, melting, juicy, and freely separating from the stone. Very free grower. A very late peach of Mr. Rivers' raising. Maintains its reputation here. Late.

**Grosse Mignonne.**—Fruit large, round, well shaped, white fleshed, with a beautiful colour on the sun side. Can be recommended with confidence for local market or export. Mid-season.

**High's Early Canada.**—An early American freestone. Skin whitish yellow, marbled with red on the sunny side. Flesh white, juicy, melting; medium size; should ripen first week in December.

**Late Crawford.**—Of similar origin to Early Crawford. Very large, roundish, yellow, with dark red cheek. Flesh yellow; flavcur rich and excellent. Shipping and drying.

**Mary's Choice.**—An American variety, popular in California, large yellow, with a red cheek resembling an Early Crawford, but ripening a little later. Suited for shipping and canning, and excellent for drying. Is doing very well where fruited here. Mid-season.

**Muir.**—A Californian seedling of great excellence, suited for shipping, canning and drying, but excelling in the latter field, where it yields a heavier percentage of dried fruit to fresh of any known variety, viz.: 1 lb. of dried fruit to less than 5lbs. of fresh. If grown on rich soil the fruit will be large to very large. Flesh yellow, very dense, and sweet. A free bearer. A perfect freestone. Mid-season.

**Newhall.**—A Californian, very large; skin yellow, deep red cheek. Flesh yellow, juicy, rich vinous flavour. Ripens one week ahead of late Crawford. Tree healthy and vigorous. Maintains its reputation here. Latish.

**Royal George.**—An old English variety of the greatest excellence. Fruit large, round. Skin very pale, speckled with red in the shade, marbled with deeper red on the sunny side. Flesh pale yellowish-white, red at the stone, very juicy, rich, delicious, and high flavoured. Excellent for shipping. Maintains its reputation in this country. Mid-season.

**Salway.**—An English variety, highly esteemed in California, where it is the standard late peach. Fruit large, roundish; skin yellow, rich crimson cheek. Flesh deep yellow, red at the stone. Adapted for both shipping and drying. Very late. Good when the country is free from maggots.

**Sea Eagle.**—A large greeny white peach, taking fair colour and distinctly pointed in shape; medium late; of indifferent quality, so far as I have tested the fruit here. Late.

**Waterloo.**—Fruit above medium size, roundish. Skin with bright red cheek, mottled, darker red side next sun. Flesh pale, with greenish tinge where shaded. Adhering slightly to stone. Melting, juicy and rich flavoured; very early, ripens same time as Early Alexander.

#### CLINGSTONES.

**Georges Late Cling.**—Large, white, flesh, yellowish green—with highly coloured bright red cheek. A good shipper and heavy bearer. Maintains its reputation here, Middle March.

**Lemon Cling.**—Large, oblong, having a pronounced lemon shaped point. Skin clear yellow. Flesh firm, yellow, and full flavoured. The best canning peach. Maintains its reputation here. Mid-season.

**Sellers' Golden Cling.**—Very large and handsome, yellow skin, taking red to bright, red on the sunny side. Flesh yellow, firm and sweet and full flavoured. A splendid canning peach, as a market fruit will sell on its size and appearance. Late, mid-season.

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#### NECTARINES.

**Lord Napier.**—An early Nectarine of large size. Skin pale cream, mottled and streaked with red and handsome red cheek. Flesh white, melting, tender, juicy. One of the earliest and best of Nectarines.

**Rivers' Orange.**—A very well-known, popular, English variety. Skin orange red next the sun. Highly flavoured. A great favourite in the English market. We may here state that Nectarines are very popular in Covent Garden, as the fruit is highly appreciated by the English palate; also they have been found to ship better than the peach.

**Stanwick.**—Fruit large, roundish, oval. Skin lively green where shaded, purple red where exposed to sun. Flesh white, melting, rich, sugary, and most delicious.

**Victoria.**—Fruit large, roundish, oval. Skin pale green and purplish red on the sunny side. Flesh white, melting, rich, juicy, delicious. Very excellent variety. February.

APRICOTS.

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**Blenheim.**—An English variety, in good repute wherever grown. Fruit of good size. Tree a vigorous grower, with abundant thick foliage, and a steady, regular bearer. I have worked over thousands of bearing-age apricot trees in California, which proved unsatisfactory bearers, to this variety, which is both suitable for canning or drying. Has also proved one of the best in Australia, as a regularly-bearing variety, yielding a superior dried product. The bearing habits of this variety is fully maintained in Africa, both East and West.

**Cape Early.**—This is propagated from selected trees of the well-known Western Province variety, and it needs no recommendation, fetching—always being first in the market—a most excellent price.

**Early Newcastle.**—A very early variety, free grower and good bearer. The fruit is of small size, and is only of value for its earliness. It pays well, however, in an early situation.

**Hemskirke.**—A valuable English variety, popular in California. A free grower, but shy bearer. Fruit is splendidly adapted for shipping, also for canning and drying. Tree a vigorous grower, with handsome and dense foliage. It somewhat resembles Moorpark.

**Moorpark.**—The best and largest of all apricots when a crop can be secured. Unsurpassed for canning, but cannot be strongly recommended for commercial plantations, as it has been widely discarded owing to its uncertain bearing. Should be tried undoubtedly.

**Royal.**—This is a highly esteemed fruit of French origin, and is maintaining its reputation wherever grown. It is one of the most widely popular apricots in America, being a steady and abundant bearer, and healthy and vigorous grower; the fruit hanging well on the tree, foliage perhaps not so dense as the Blenheim. The fruit yields a first-class canned or dried product. Mildura speaks very highly of it in every respect. This variety has thoroughly maintained its reputation here, wherever planted, so far as we know.

## PLUMS.

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**Belgian Purple.**—Fruit medium size, roundish. Skin deep purple, covered with blue bloom. Flesh greenish, juicy, sweet. A valuable cooking plum. March.

**Clyman.**—A standard early plum of Californian origin, largely shipped to the Eastern States, where it fetches good prices. Mottled, reddish purple, blue bloom; free stone; flesh firm, dry and sweet. Ripens with the Cape Red Cherry Plum. Bears heavily in some situations here.

**Coe's Golden Drop.**—Fruit very large, being generally about  $2\frac{1}{2}$  inches long and 2 inches in diameter, oval. Flesh yellowish red, sugary and delicious, one of the most delicious dessert plums and a good shipper.

**Czar.**—Fruit large, oval, roundish. Skin dull red to quite black when well ripened, covered with blue bloom. Flesh tender, sweet, juicy, separating freely from the stone. A very valuable cooking plum. Tree a free grower and abundant bearer. January—February.

**Damask.**—(Constantia.) A handsome, oval, purple plum of the largest size, covered with blue bloom. Flesh yellowish, juicy, sweet, delicious. Has a great local reputation, last year fetching 6s. a hundred on the Cape Town market. A free grower and good bearer.

**Diamond.**—English. Branches long. Fruit of the largest size. Skin black, covered with a blue bloom. Flesh deep yellow, coarse-grained. Free stone. A cooking plum of better quality in this country than at home. A heavy cropper. February.

**Goliath.**—Fruit very large, oblong. Skin deep reddish purple, paler on shady side, covered with blue bloom. Flesh yellow, juicy, adheres to stone. A fine showy plum, suitable for dessert, and an excellent culinary fruit. February and later.

**Greengage.**—It is hardly necessary to describe this plum, of good repute in every country.

**Imperial Gage.**—Very large. Flesh slightly yellowish, colour bright yellow. Highly recommended by Mr. Van der Byl, of Constantia, who always gets highest price for this variety and finds it suited to every soil. Free stone.

**Jefferson.**—Fruit large, oval. Skin greenish yellow, becoming a rich golden yellow with red on the sunny side. Flesh yellow, firm, juicy, rich, delicious. A splendid American dessert plum, and a good shipper. February—March.

**Kirk's.**—Fruit above medium size, round. Skin dark purple, with a few deep yellow spots, and covered with blue bloom. Flesh greenish yellow, fine, juicy, richly flavoured. Separates freely the stone. A splendid dessert fruit, and a good shipper, hardy and vigorous, and an abundant bearer. February and March.

**Large Black Imperial.**—Fruit large. Skin very dark purple, or rather deep crimson, paler where shaded. Flesh yellow, juicy, firm and sweet. A fine dessert fruit and cooking plum. Tree a very healthy and vigorous grower of its class. March.

**Peach Plum.**—Fruit very large, roundish, brownish red, coarse-grained but juicy, pleasant flavour. A well-known California early shipping plum. January.

**Pond's Seedling.**—A very valuable English variety, highly esteemed and very extensively shipped from California under the name of Gros Prune, very popular in the Eastern States. Fruit very large, oval. Skin from dark red, thickly strewed with grey dots, covered with bluish bloom. Flesh yellowish, juicy, briskly flavoured, adhering to the stone. A beautiful plum. February and March.

**Reid's Late Gem.**—A valuable new late plum from New Zealand, forwarded to me by Government Pomologist, who strongly recommended it. Very late and moderate grower. Bears heavily here and can be recommended.

**Rivers' Early Prolific.**—Purple, oval, medium size, juicy, and good, free stone. A free grower, healthy, and an enormous bearer. Maintains its reputation where fruited here. Will ripen January and February. One of the best cooking plums.

**Rivers' Late Prolific.**—A seedling of Early Prolific, with the same characteristics, but ripens three weeks later.

**Tragedy.**—A standard early shipping plum of Californian origin. Very popular in the Eastern States. Should ripen here before Cherry Plum season is over. Medium to large. Skin purple. Flesh yellowish green, very rich and sweet. Perfect free stone. Behaviour here as to growth excellent, bearing qualities not so certain.

**Victoria.**—A well-known and very popular English plum. Strong grower and productive. Large, roundish, oval. Light yellow, shaded with lilac and purple. Flesh golden yellow. Worthless along the coast. February.

**Washington.**—A very excellent American plum. Fruit large, roundish, oval. Skin dull yellow, mottled and clouded green; when fully ripe, a dead yellow, mottled with red spots, covered with pale grey bloom. Flesh yellow, firm, rich, sugary, and a luscious flavour. One of the best plums. Tree hardy, free grower, and abundant bearer. Has been successfully shipped from California to England. February—March.

**White Magnum Bonum, or Yellow Egg.**—Fruit of the largest size, oval, soft. Skin very thick, adhering to the flesh; deep yellow, covered with white bloom. A valuable cooking and dessert plum. A first-rate shipper. Free, healthy, vigorous, and a good bearer.

**Damsons.**—A selection of the best sorts, suitable for jam-making only, including Bullace, Cluster, Bradley's King, Kentish Bush, Trognore.

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## JAPANESE AND ORIENTAL PLUMS.

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**Abundance.**—(Yellow fleshed Botan.) Medium in size (large when thinned), varying in shape from round to pointed. Colour rich yellow, splashed and dotted red on the sunny side; in some cases almost completely coloured red. Flesh deep yellow, juicy, sweet, and of good quality. A strong growing upright tree, and free bearing, as its name implies, and highly popular in the United States. Early mid-season. Two weeks ahead of Burbank in ripening. An early bloomer.

**Burbank.**—A very excellent variety, and highly popular. Fruit nearly round and clear cherry red, with a lilac bloom. Flesh deep yellow, very sweet, with a peculiar and most agreeable flavour. Tree vigorous and an enormous cropper. Excellent for shipping. Mid-season. Can be with confidence recommended. Doing excellently where tried here. A late bloomer.

**Kelsey.**—The latest of all the Japs, and the largest. Fruit heart shaped. Colour rich yellow, nearly overspread with red, and a lovely bloom. Flesh firm, very rich, and of excellent quality. Tree a free grower, but not stocky. Long willowy shoots. Excellent shipper. Widely tested here, and has given uniform satisfaction, its fruit having been frequently exhibited in public. An early bloomer.

**Ogon Magate.**—Large, round, golden yellow. Flesh yellow, firm, with a peculiar sweetness. Tree a free grower, and good bearer. Early. December and January.

**Pissardii.**—A decorative tree of great beauty. Foliage red to copper colour, carrying a crop of small but palatable fruit. Should be scattered through every shrubbery for effect, but is not recommended for orchard planting.

**Satsuma.**—(Blood Plum.) Fruit of large size, and nearly round. Skin dark red with a red bloom. Flesh dark purplish red. Stone very small and pointed. An excellent shipping plum, and the tree a free and hardy grower and great cropper, as indeed are all the Japanese varieties.

**Shiro Simomo.**—Large, bright yellow, of the Greengage type. Tree healthy, and a vigorous grower and heavy bearer. Very excellent and satisfactory in every respect. February.

**Simon.**—A very excellent early-shipping plum of Chinese origin. Tree an upright grower, with a profusion of long willowy shoots, and leaves quite distinct. The fruit differs from every other plum. Tomato shaped. Colour cinnamon red. The flesh is firm, rich, sweet, and delicious, pineapple mingled with banana flavour. A very popular table fruit, and a splendid shipping fruit, always fetching the best prices. Has been sent successfully from California to England. December to January. An uncertain bearer in the Western Provinces in Africa.



## PRUNES.

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**California D'Agen.**—Described, page 60.

**Golden.**—Originated in Oregon, and described, by Seth Llwelling, its introducer, as follows:—Larger than Italian; light golden colour. Exquisite flavour; dries beautifully, and when dried, 24 prunes weigh one pound. A beautiful grower, with heavy dark-green foliage. An abundant bearer, and one of the best canning fruits known. Easily peeled, and separates readily from the stone, which is quite small for the size of the fruit. Uncertain along the coast.

**Robe de Sargent.**—Fruit oval. Skin deep purple, nearly black. Tree a good grower, but not a very heavy bearer. Fruit a bit larger than D'Agen.

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## CHERRIES.

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**Black Tartarian.**—Fruit of the largest size, and bright purplish black, juicy and sweet. Tree a very vigorous grower and prolific bearer. The standard black cherry of California. Ships very well. None of these cherries so far as we know have been tasted commercially here.

**Early Rivers.**—An excellent early black cherry, nearly an inch in diameter: stem very small. An excellent bearer. Well worthy of a trial.

**Kentish.**—Fruit medium size, round, red, changing to purple if allowed to hang. The best cooking cherry. A free grower and abundant bearer.

**May Duke.**—An old and standard variety. A dark red colour. Flesh juicy, rich and sweet. Early.

**Napoleon Biggareau.**—A splendid cherry of the largest size. Pale yellow, amber in the shade, beautifully marked with red, and a bright red cheek. Flesh firm, juicy, sweet. A free grower and abundant bearer. A splendid fruit for canning, and ships well.

# MISCELLANEOUS FRUITS.

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**FIGS, QUINCES, SOFT-SHELL ALMONDS,  
JAPANESE WALNUTS, &c.**

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## CITRUS FRUITS.

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Considerable attention has been devoted of late years to the development of the orange and lemon industry in the Colony and in the Transvaal, and we consider that this spirit of enterprize is being directed into a proper channel, as there is undoubtedly room for very many more orange and lemon orchards than we at present have. The development of orange orchard planting in the West began in 1892, in which year it was recognised that the days of the Australian bug were numbered, thanks to the energy of the two ladybirds: the Vedula, which was imported from California in the latter end of 1891 by the Government, and also the Rodolia, which as far as we know is indigenous to this country and possibly a South African species. It has generally been claimed that the credit was almost entirely due to the work of the imported Vedula; we however differ in this, our idea being that although the Vedula was the more useful insect of the two, being a greater glutton, our local friend had already got the bug under, throughout the Colony, before the Vedula had established himself sufficiently to warrant his being turned out among the bugs from the specially constructed houses which Mr. C. D. Rudd had built for their accommodation. In the Eastern Province we cannot but think that the ravages of this pest were not nearly as severe as in the West. In our Province hardly an orange tree but was so badly affected, and such a beastly sight that it was cut down either just above the ground or at three to six feet above, and very many thousands of orange trees of above fifty years of age, and standing like forest trees, were grubbed out and burned. We consider the reason that the West suffered worse being that the Rodolia made its appearance in the East, perhaps had always been there, and in those parts was in sufficient force to prevent the entire destruction of the tree as happened here.

We may here state that the *Australian bug* (*Icerya Purchasi*) has been one of the most terrible pests that have affected vegetable life, and has been known all over the world. In the latter 80's and early 90's the State of California was ravaged by this pest, and the growers were threatened with total ruin, which would have practically been a collapse of the southern part of the State of California. The State Board of Horticulture however grappled with the question, and sent one of their Entomologists to Australia to discover if possible a parasite; this was in a short time successfully done, with the same little friend that California gave us a few years later, to wit, the Vedula Cardinalis.

## OLD ORCHARDS.

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Mr. Liebbrandt (Keeper of the Archives) states that the Citrus family were introduced by the Dutch East Indian Company mainly from St. Helena, where they had been planted very many years before by the Portuguese, and doubtless were also obtained from India and the East, as the ships of the company were trading throughout the Eastern seas, and seeing the attention the company were bestowing on Agricultural Development every step would doubtless have been taken to secure and safely land the very best varieties from all the ports of call for the company's ships. We should gather that no fruits introduced in these days gave greater prospect of bringing wealth and benefit to the country than oranges. Undoubtedly they flourished exceedingly wherever planted, and wherever the settler trekked further inland orange trees were invariably planted by him and almost invariably thrived. The French Huguenots in particular took up the matter of orange growing with great spirit, their orchards in Drakenstein Valley and French Hoek being celebrated at an early period. In fact wherever Citrus trees would grow in Africa they have followed the colonization of the country, both amongst the early English settlers in the East and the Dutch as they trekked through Natal and the Transvaal.

There is no doubt that Citrus fruits are very much at home in Africa; we think that some of our old orchards will hold their own with any in the world for health and vigour. We have ourselves seen many of the older groves along the Mediterranean in France, Spain and Northern Italy, and have seen none of them approaching in general health and appearance even our average grove at the Cape. However, the ravages of the Australian Bug and the mal di goma (root rot) have played havoc amongst our oldest and finest groves; the great majority of these have now already disappeared and of the remainder collar rot is taking them off very rapidly, or if not killing them out, at least injuring them to sufficient extent to render them of not the same account either in appearance or bearing capabilities that they formerly were.

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## DEMAND.

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The production of oranges in Africa has fallen very much below the demand owing to the destruction caused by the Australian bug, and the "root rot." Between these two scourges the great majority of our oldest and finest orchards have gone under. We have no hesitation in stating that twenty years ago the production of oranges was greater than it is to-day. It being

probably one of the very few articles of commerce which has not moved on somewhat proportionately to the development of the country. We have heard over and over again from farmers of the glory of the former orange groves in the West, and how wagon loads of oranges used to be taken into Cape Town, bring the grower between one and two shillings per hundred, and at these prices many farmers cleared between £500 and £1,000 per annum for their groves. To-day we know the demand for oranges to be excellent, and that it will be an increasing one we are sure.

*Export.*—In regard to the export at the present time we are not prepared to give an opinion. However, that oranges can be landed in London in excellent condition we are sure of, because we have done it ourselves, and our idea is that a trade can be worked up if found necessary, but it will be many years before there will be any occasion to go outside our own country for a market. The following, cut from the "Daily Chronicle," will be of general interest as showing, the enterprise of Australian growers. We very naturally should be able to do infinitely better if we manage our business properly. "Oranges from Australia? Yes and capital fruit too, and lemons, which are regarded as the complement of oranges—perhaps because they grow under similar conditions. This is another step in the direction of an all-British fruit supply, and, for that reason, to be recommended. The first shipment of oranges from 'down under' has just been sold at Covent Garden, and one may now eat the juicy product of trees grown on the Mildura settlement, Victoria. Hitherto, with the exception of a single shipment of lemons to England seven years ago, the growers have been content with the home market. But now they are eager to conquer the old country, and to that end 500 cases of oranges and lemons arrived on Wednesday, and another 500 will reach here in a fortnight. The first sale was somewhat of a disappointment. The prices fetched were low, and Mr. Pickering (brother to Mr. F. W. Pickering, of Mildura) thinks there is a prejudice against Australian fruit of this description. He assured us that it is selected and packed with the greatest care—the motto of the exporters being 'No rubbish.' The average of damaged fruit in a case of 150 or so after its long voyage has been three. In future it is proposed to have a sorting warehouse, so that even these three may be eliminated. The season for Australian oranges will be approximately from the beginning of August until the end of September, which is just the time when a really good orange will be most agreeable to the English palate. At present the fruit has been sent by water to Adelaide for shipment, a distance of about 300 miles; but the Government have decided to build a light railway, and the work will shortly be taken in hand."

For lemons the demand is a steadily and increasing one, and we have no doubt at all that there is room for a largely increased acreage. In the proper curing will be the solution of the question as to what extent the business can be increased.

## SITE FOR CITRUS ORCHARD.

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In deciduous planting, as we have already stated, we almost always have reason to deplore the absence of data, as to whether trees will grow or no. As in deciduous trees, where the seedling and coarser sort of grafted tree will thrive, it does not follow that the more delicate and more valuable fruits will always do well; we consider however that in Citrus growing it can be *practically* recognized as a fact that when seedling oranges will grow and thrive, improved varieties will also do so. We are therefore at once placed in the position of having data in citrus growing practically all over South Africa. This helps us considerably. In fact, we consider very good work has been done in orange growing as regards sites. It has been actually proved all through the Colony, also throughout the Orange River Colony and Transvaal, at all events the best districts and the most favourable sites for planting. The opening up of the higher tableland for citrus planting would have been quite a problem without such data, as it has been demonstrated that it is only certain locations that are at all suitable, owing to the prevalence of frosts in the higher veld. One site may be perfectly free from frost, whereas another, a few hundred yards away, is swept by frosts or cold winds which would render the planting of citrus trees a fatal investment. It takes years to arrive at this knowledge, and it is the years of settlement mainly by the Dutch that has given us this valuable knowledge. Take Florida, every orange grower knows how the State has been devastated by occasional frosts, which have swept through wide stretches of the country, cutting down to the ground thousands and thousands of acres of bearing orchards. We take the Florida situation in this way. The old Portuguese settlements along the coast had luxurious old orange groves, which as the State was developed and as the transport of fruit to northern markets became a fact, were found to pay well. Thereupon land speculators and others boomed the country as an orange growing country, and the boom took on. People rushed to the conclusion that because orange trees in old orchards thrive in certain districts, that large stretches of country were equally suited, consequently trees were planted out by thousands in districts that might not perhaps catch a frost in ten years. We see the same result in a different direction resulting from Uitlander enterprise in the Transvaal. Millions of blue gum have been planted because they are quick growing; we ourselves have seen hundreds of acres of them destroyed by frost; we believe it is now recognised that a hardier tree is required. Therefore let us use the data which is before our eyes over the country, and recognize that the limit of citrus culture is in no particular area of altitude or otherwise, but that

right through the whole country, regardless of the general conditions prevailing in the district, there are sheltered spots eminently suited for our purpose, many of which have already been located for us. Given a site where temperature is right and also a water supply, the next point to consider is the character of the soil. There are no two opinions on this point. Citrus trees to grow healthily and live long (in other words to pay well) must be planted on *well drained soil*; personally we infinitely prefer a soil naturally well drained; in fact, a naturally dry soil, which is of such a character that it readily accepts water into its depth. Of such class of soils, there are hundreds of thousands of acres in the Colony, provided the necessary water could be brought into them in sufficient quantity for practical purposes. We should always avoid sites which are naturally moist and wet, as the trees will never give satisfaction in such a location. We remember a noteworthy case in point. Mr. Rhodes some four years ago dispatched a consignment of orange trees to Rhodesia to be distributed for planting, a couple of hundred were planted on his own farm in the Matoppo, the only water supply here at that time being a windmill pump, delivering the water into tubs. The well had as usual been sunk in the part of the farm which showed indications of being the wettest, and the trees were planted in a couple of acres of land adjoining the well, so that they would be handy for watering by means of the barrels, which were we believe placed on a sledge for this purpose, the idea of course being that by placing them near the water they would be less likely to suffer, consequently they were standing in soil where we feel certain they could not do themselves or indeed anybody else credit. Here is the point in planting citrus orchards: *don't take your trees to the water but lead your water to the trees.*

The site secured, which should be a sheltered one, little affected by frost, the next vital consideration is water; we think that in only very few favoured spots in South Africa can Citrus growing be made profitable without water. We would ourselves hesitate to recommend the planting of such an orchard without having a water supply behind it proportionate to the number of trees to be irrigated.

As to the method of applying water when one has the supply available, we consider that there is great room for improvement, whilst recognizing the fact that it is in many instances impossible to follow our directions. Owing to perhaps many causes we still think it advisable to recommend the system of irrigation by means of furrows as explained in the article under the head of "Orchard Irrigation" on page 22.

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## SETTING OUT AN ORCHARD.

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An orchard can be set out at any time during the periods that the trees are dormant, probably from June to September is the time when they are most so. Should, however, the trees be in tins, with careful handling when they are removed from the tins they can be set out in orchard even when they are growing, but each tree must be well watered at once or many will die. There is a good deal of difference of opinion as to whether it is best to plant trees direct from tins or with bare roots. We would say that should the tree have been dug out of the nursery without much displacement of soil and just left long enough in the tin to get established we would prefer it at an increased price, roughly 1s. per tree. But we have satisfied ourselves that if well dug and every detail of the packing is carefully done Citrus trees can be safely transported any distance in the Colony with a small loss on being planted out. But growers must remember that a plant in foliage at the time of planting needs much more careful attention, as although the tree may be quite dormant at planting there must necessarily be a good deal of evaporation through the leaves, and this evaporation must be met by keeping the soil around the tree moist.

At once after planting we recommend the trees should receive water, and that the surface of the soil around each tree should be mulched with hay, straw, grass or bushes, or indeed anything which will retain the moisture; it is a good thing also to protect the tree from the direct rays of the sun, either by reeds, stakes, bagging, or indeed anything which will serve the purpose. We are inclined to think, the defoliation of the young trees to prevent evaporation is ~~not altogether~~ desirable, as the benefits derived from it are more than counteracted by the danger of having the tree scorched by the winds which are very prevalent throughout the country.

The general directions given under the head of "Planting Deciduous Trees," equally applies to Citrus trees, too much care cannot be taken in every detail of the work.

*Don't plant too deep.* It is a mistake which is very generally made throughout the country, and is of vital importance. In Florida, where the soil is shallow, and the climatic conditions are equable trees are often planted on the top of the ground, and the soil thrown up against them; we do not of course advocate this, but we do say keep the place where the bud is inserted well above the ground, letting the crown of the roots be covered a few inches only. Many growers have told us that it is impossible to keep trees clean from scale if they have been set too deep; we cannot state this from our personal experience, but we do know that in Florida it is generally recognized to be a fact, and it must

be borne in mind that Florida is a State of *shallow soils*, and in many instances we believe badly drained, whereas California is a country of very deep soils. We feel satisfied that in shallow soils deep planting will certainly bring an orchard into an unsatisfactory state sooner or later, while in deep soil it is still quite an important matter to keep the trees well up at planting.

Never manure your trees when setting them, it is a dangerous thing to do; wait until your trees are well established in a few months, then the manure can safely be applied and will be readily and promptly brought into solution by the irrigation water, which should be immediately applied, the tree should then very shortly respond.

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## STOCKS.

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There has been a great amount of controversy as to the best stocks for growing citrus trees in this country. Mainly through the scare caused by the ravages of the disease known as *mal di goma* (root rot) there would have been no controversy on the point, except for the general depredations of this disease. We have studied the matter somewhat carefully, covering some years now, and our opinion is that those who would try to lead planters to accept the Bitter Seville as *the* stock for Oranges and Lemons, regardless of the variety, are not doing growers any kindness. It is well known to most nurserymen who grow citrus trees for sale that they have had to discard the Seville stock for several varieties of the citrus family, and it is a great error on the part of planters to insist on this stock. The fact of the matter is that nurserymen in filling the orders of those planters who insist on Seville root for every variety have the utmost difficulty in bringing the tree to a decent size for sale.

We are one of those who for certain varieties are in favour of the old "Cape Lemon" as a stock, and although we fly in the face of most others whose opinion is of value on this point, we are quite prepared to stick to our view. It is well-known to us that for some varieties grown in Australia, this is the only root that gives satisfaction, and the same will be proved here in course of time. We cannot understand why this variety is so bitterly condemned as a stock, because it is a well-established fact to those who have studied the matter, that a great number of the orchards of fifty years of age and upwards, are worked on this root where they are not seedlings. In fact quite a fair proportion of our oldest orchards (and surely it has been the survival of the fittest) are worked on rough lemon; we do not for a moment advocate the wholesale adoption of the rough lemon as a stock, but we wish to point out to growers that in our opinion there are other stocks which have already stood the test of time in the country we live in.

We fancy that many minds have become confused on this important question of stocks through a failure to identify *the sour orange of Florida*. Now this sour orange, which is growing wild in many parts of Florida, having been introduced probably during the early Portuguese colonization, has been proved to be a certain-resistant stock against "mal de goma" both in Florida and California. It is not however the Bitter or Seville Orange but a distinct variety, and in our opinion is very closely allied to a species of rough lemon that we find growing in several parts of the Colony; some of our readers may know it, a rough coarse fruit with the deep brilliant colour of a highly coloured orange and the full acid flavour of the lemon, in fact, a lemon with the appearance of an orange.

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## IMPROVEMENT IN VARIETIES.

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A movement has been going on for the last forty years, never however at any time with any great degree of spirit, to improve the varieties of Citrus trees growing in Africa. The credit for this movement we believe should belong entirely to the East, as we know of no instance within our knowledge in the West where any steps have been taken to bring in the newer and more popular varieties. Eastern Nurserymen, particularly those managing the several Botanical Gardens, have done most excellent work in the field, so that to-day we find the new varieties in Citrus fruits have been almost entirely disseminated by Easterners; they being also introduced to the West from this source. Among growers there is to-day considerable uncertainty as to whether the right and proper thing is being done in discarding seedlings for what are called "new varieties," arrived at by either budding or grafting; we are very solid on this, and give below the points in favour of the respective views.

Those who favour the planting of seedlings will argue:

1. That a seedling is hardier, more strong growing, and bears bigger crops. This we will readily admit.

2. The advocates of the budded tree will claim the fruit fetches a higher price, and tree comes into bearing earlier. Also true.

We give our verdict in favour of the newer varieties:

Firstly.—Because we consider the seedling tree planted on good soil here grows so freely that when it becomes over fifteen years of age, it is almost an impossibility to eradicate the pests that affect it; it grows to a size which makes it very difficult to fumigate it, and it is much more difficult to get at with a spray. Whereas a budded tree takes a great length of time to attain the same size, even if it will ever do so, we ourselves having never seen a

worked orange tree of above 15 feet high, therefore a budded tree can be readily fumigated or sprayed even when it attain great age.

Secondly.—The seedling will not come into bearing until the 7th or 8th year, whereas a healthy budded tree will come into bearing and pay well in the 4th year.

Thirdly.—Because a budded tree can be planted closer than a seedling, 20 ft. to 25 ft. being ample distance apart for worked citrus trees whereas a seedling should be set at 30 ft. apart, thus giving a greater number of trees to the acre.

Fourthly.—Because by the planting of budded trees the season for harvesting the crop is considerably extended, always an important point in commercial fruit growing, invariably resulting in better prices.

Fifthly.—Because it is always advisable to allow the opinion of other people and the trend of work being carried out in other countries who are engaging in kindred enterprises to influence one, and thus we find in California the planting of seedling oranges practically discontinued. We have ourselves worked in several Citrus Nurseries there, and can truthfully say that we have never seen a seedling sold.

Again in Australia where in localities considerable attention is being given to citrus growing, we find the planting of the very best varieties of worked trees only being advocated, planters finding out that they have even many varieties of budded and grafted trees which are quite inferior to others.

In Spain, in "La Vuelta" of Valencia, which is a large stretch of very valuable irrigable land stretching many miles, and from which the English market draw a large part of their supplies, and where we ourselves saw tens of thousands of newly planted orange orchards, worked trees are being entirely planted. We can only add in conclusion that buyers of oranges in the Colony are quite willing, and indeed do pay in many instances double the money for the fruit of the improved varieties.

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## PRUNING.

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The pruning of Citrus trees is very simple ; we consider the cutting away of strong water suckers and the keeping of the centre of the tree open so that one can get up and pick the fruit from there when the tree grows large as being all that is necessary.

We note from Californian papers that a new system of pruning the lemon has taken a firm hold on the minds of some

growers, the main idea on this system being to cut away all the branches that are inclined to run to the perpendicular and keep the top of the tree quite low, and allowing the branches to spread out horizontally like a big umbrella. We do not however, feel inclined to advise such a wide departure from ordinary practice until the system is adopted extensively by growers.

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## MAL DI GORMA.

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### [OR ROOT ROT.]

This disease is so widely spread about amongst Cape Orchards that we think it will not be out of place to insert here the treatment as recommended by the U.S. Department of Agriculture, who have made exhaustive enquiries on the subject :

1. Remove the earth from about the roots for 2 or 3 feet from the trunk, being careful not to wound the healthy root. . . . . In all cases the roots should be left exposed till recovery takes place, except possibly during a portion of the winter when severe freezes are liable to occur.
2. Cut away all diseased spots in the bark of the roots or trunk and cover the wounds with one of the following antiseptic solutions : (1) Sulphurous (not sulphuric) acid, 15 parts to 85 parts of water. This may be sprayed on the roots. (2) Carbolic acid, 1 part of crude acid to 1 part of water. When diluted 1 to 5 this may be sprayed over the roots. . . . . These solutions should be kept in wooden or glass vessels and should not be allowed to come in contact with metals. It is possible that either of these applications will prove of benefit even if the diseased spots are not cut out. In this latter case, however, care should be taken to saturate the bark of all diseased spots with the solution.
3. When the diseased trees are old and closely set, so that the ground is much shaded, every other tree should be removed and replanted in a new grove.
4. Avoid highly nitrogenous fertilizers in diseased groves, using preferably Nitrate of Soda, or Sulphate of Ammonia, as a source of Nitrogen.
5. All tools used in infected groves should be cleaned and washed with crude carbolic acid before they are used in healthy groves.
6. In setting new groves dead trees should be replaced with trees budded on resistant stock.
7. Avoid excessive and deep cultivation in diseased groves. Injuries to the roots, such as are often caused by deep ploughing, seem to greatly favour the spread of the disease.

## VARIETIES OF CITRUS TREES.

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**Blood.**—One of the blood oranges, probably Maltese; the peculiarity of the fruit lies in the flesh being streaked and mottled with red; this, however, does not appear much in the fruit of a young tree. Bears well and brings satisfactory prices. Small to medium in size.

**Jaffa.**—Imported from Jaffa *via* California. Grows strongly and bears freely; in every way a desirable variety; rind medium thin, excellent flavour, early bearer; is the same orange that is so well received in London from Jaffa.

**Joppa.**—A California seedling grown from a seed received from Palestine. Fruit oblong, almost seedless, thin rind, very juicy and sweet; can hang long on the tree.

**Mediterranean Sweet.**—A well-known and popular California variety; bears young and abundantly; fruit of good quality, rind thin. Fruit not very deep in colour. Tree not a free grower.

**Paper Rind St. Michael.**—Medium size fruit with an exceedingly thin rind; we think will be popular; has been sent to England, carrying well. Tree not a free grower but early bearer; will become very popular locally when known.

**Valencia Late (Hart's Tardiff).**—A very popular variety tested here; bears well but not when the tree is small; hangs very late on the tree, in fact green when most of the others are picked; as a market variety will prove very remunerative.

**Washington Navel.**—Well-known throughout the world and realizing the best prices; of good size, delicious flavour, and almost seedless; bears well and grows freely. We think the quality is a good deal dependent on the conditions under which it is grown, becoming in some localities and situations of much superior quality than in others.

**Genoa Lemon.**—Medium size, a long oval, of good shape and appearance, and of the very best quality. We consider, to get in every respect a first-class lemon, one need go no further than this variety; grows freely and bears abundantly.

**Villa Franca.**—Of larger size than the Genoa ; oval, but more bulged ; an excellent lemon in every respect, bears freely and young, flavour good.

**Grape Fruit (Triumph).**—Has lately become very popular in the United States, mainly for its medicinal properties, which are undoubted ; is eaten with sugar, and acts on the system as a refresher. A very strong grower.

**Naartje.**—A selected variety of the Cape Naartje ; can be in every way recommended.







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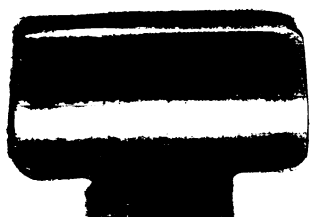
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